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Effects of the COVID-19 Pandemic Nationwide Lockdown on Mental Health, Environmental Concern, and Prejudice Against Other Social Groups

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Abstract

The COVID-19 pandemic has hit humanity globally. Besides its obvious threats to our physical health and economic stability, one can only speculate about the pandemic's and its countermeasures' psychosocial impacts. Here, we took advantage of a sample of healthy male participants who had completed psychosocial measures on mental health, environmental concern, and prejudice against asylum-seekers just before and during the

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nationwide lockdown in Germany in spring 2020. A follow-up assessment of 140 participants during the lockdown provided a unique opportunity to track psychosocial changes in a prospective longitudinal study design. In comparison to before the lockdown (1) mental health worsened, (2) environmental concern increased, and (3) prejudice against asylum-seekers decreased. Our study demonstrates psychosocial "side effects" of the pandemic that bring both challenges and opportunities for our society with regard to the handling of psychological reactions to this pandemic and further global crises, including climate change and mass migration.

Keywords
COVID-19 pandemic, environmental concern, mental health, out-group prejudice, social behavior

The coronavirus disease (COVID-19; Huang et al., 2020) pandemic is an unprecedented experience for all societies. Declared a pandemic on March 11, 2020 (World Health Organization, 2020a), more than a year later, this disease has already infected almost 200 million people and been associated with over 4,000,000 deaths (Johns Hopkins University, 2020). To curb the disease's spread, most governments have imposed nationwide lockdowns involving dramatically reduced (physical) social interactions, limiting humans' ability to mentally cope with this crisis by socially approaching others (Taylor, 2006). Consequently, besides the obvious threats to our physical health and economic stability (Douglas et al., 2020; Presti et al., 2020), it is crucial to illuminate the pandemic's and its countermeasures' less obvious but intense and potentially long-lasting mental health effects (Buzzi et al., 2020; van Bavel et al., 2020) which have been noted in association with previous large-scale, albeit less global crises (e.g., terroristic acts, environmental disasters; Garcia & Rimé, 2019; Silver et al., 2002). Unlike those crises, the COVID-19 pandemic lockdown is also special in that it creates tensions between people's self-interest (e.g., pleasure of meeting friends) and the collective interest at large (e.g., not meeting friends in order to curb the spread of the disease), that is, a social dilemma (Johnson et al., 2020; Pfattheicher et al., 2020). This raises the question how this crisis affects our attitudes regarding other ongoing large-scale and red-hot social dilemmas involving a conflict between self-interest and collective interests as well, namely climate change (e.g., reducing greenhouse gas emissions vs. enjoying global travel) and mass migration (e.g., sharing collective goods with refugees vs. restricting collective goods to the country's residents; see Böhm et al., 2018; Milinski

et al., 2008; for game theoretical operationalizations of these dilemmas). On the one hand, the social disconnection and mental burdens potentially experienced as well as the permanent need to restrain self-interest might trigger a focus on one's own life (i.e., ensuring one's own and the family's safety and economic well-being), thereby lowering collective interests (e.g., van de Groep et al., 2020). On the other hand, the experience of a collective crisis that one fights by collaboratively restraining self-interest could just as well enhance collective interests (e.g., Garcia & Rimé, 2019; Sibley et al., 2020). In a similar vein, acting prosocially (at high personal cost) in one domain has been shown to increase prosociality in other domains, too (Gneezy et al., 2012; Schiller et al., 2020a). It is yet unknown how very costly (and enforced) prosocial behavior due to the COVID-19 lockdown may affect attitudes related to prosociality in other domains, that is, mitigating the negative consequences of climate change and providing asylum to people in need. To tackle these unresolved issues, the present longitudinal follow-up study compares data from a sample of healthy young men collected before and during the nationwide pandemic lockdown in Germany with regard to mental health, environmental concern, and prejudice against asylum-seekers.

Since the pandemic's start, scientists have been assessing mental health changes in the general population. Obviously, both the pandemic and its countermeasures may cause psychological distress, for example, by evoking health-related worries, and by exacerbating feelings of social isolation (Brooks et al., 2020; van Bavel et al., 2020). Indeed, initial findings have revealed increased prevalence of mental health problems during early phases of the pandemic. Representative polls show that people report feeling more anxious, depressed, and stressed during the pandemic lockdown (Forsa, 2020; UNICEF, 2020). Moreover, a review of 62 studies from 17 countries around the world on the mental health impacts of the pandemic in the general population reveals a 32% prevalence of anxiety-related symptoms and 27% prevalence of depression-related symptoms (Luo et al., 2020). However, while these studies give valuable hints of the mental health state during the pandemic, they lack baseline data collected *before* the nationwide pandemic lockdown within the same individuals. Large longitudinal study panels are able to provide such baseline data. These studies corroborate the finding that the COVID-19 pandemic indeed impairs the mental health state (e.g., increased mental distress, decreased life satisfaction, stronger anxiety- and depression-related symptoms) in the general population (e.g., Gan et al., 2020; Kim et al., 2020; Pierce et al., 2020; Shanahan et al., 2020; Sibley et al., 2020; Zacher & Rudolph, 2021). The current project aims to expand upon this research by revealing specific pandemic lockdown-related *changes* in depression-, anxiety-, and somatization-related symptoms that

were collected immediately before and during the lockdown and by relating potential changes in these variables to potential changes in psychosocial attitudes such as environmental concern and prejudice against asylum-seekers.

Just as it affects our mental health, the COVID-19 pandemic might have far-reaching consequences for another, over the long-term potentially even more devastating world-wide crisis, namely climate change. Paradoxically, by paralyzing (air) traffic and industrial emissions, the pandemic's countermeasures have virtually "cleaned the skies," causing enormous reductions in carbon and nitrogen dioxide concentrations in the air (Achebak et al., 2020; Kanniah et al., 2020). These quick and wide-ranging "incidental" positive effects on our environment have boosted movements to "build back better" from the pandemic in a way that confronts climate change (Rosenbloom & Markard, 2020). But while such movements seem to be gaining supporters, it remains an open, empirically unaddressed question whether the pandemic has actually shifted our environmental concerns. Two world-wide surveys collected after the start of the pandemic show that the majority of respondents ($>$70%) consider climate change as serious a crisis as COVID-19 (Ipsos MORI, 2020a), and think that their government should prioritize environmental protection after recovering from COVID-19 (Ipsos MORI, 2020b). These findings suggest that the pandemic may constitute a "game-changing moment" significantly deepening people's environmental concern (already deep in Germany before the pandemic's outbreak; BMU, 2019; BMUB, 2017). However, on the other hand, the pandemic has triggered the most significant economic world-wide crisis since the 1930s, creating pressure to stabilize the economy by prioritizing economic concerns over environmental ones (Rosenbloom & Markard, 2020). In addition, at least some individuals may prioritize their own safety over environmental concern, for example by using their car instead of public transportation or by using (presumably safer) single-use plastic masks rather than re-usable ones (Prata et al., 2020). By capitalizing on our longitudinal follow-up study design, we aim to contribute to clarifying the consequences of the first pandemic lockdown's effects on our environmental concern.

The pandemic might not just affect how we feel about ourselves or the environment, but also about members of other social groups (for evidence demonstrating moderating effects of social group membership on social behavior, see, e.g., Schiller et al., 2014; Schiller et al., 2020b). Shortly before the COVID-19 outbreak, mass migration peaked with nearly 80 million individuals forced to flee their homes (United Nations, 2020). Consequently, the lives of millions of migrants are endangered, and huge challenges are created for immigration countries where extremely polarized attitudes toward asylum-seeking immigrants have developed (Anderson & Ferguson, 2018).

As with climate change, the pandemic's effects on prejudice toward other asylum-seekers still need to be identified. Throughout history, outbreaks of infectious diseases have been associated with scapegoating specific out-group members (van Bavel et al., 2020). Indeed, there have been first reports of increased discrimination against Chinese individuals in some Western societies during the COVID-19 pandemic (Devakumar et al., 2020). Conversely, a global pandemic may also create chances to reduce out-group prejudice due to coordinated efforts across individuals and societies to contain the disease's spread, in turn evoking the feeling of sharing a common fate and belonging to a "superordinate category" (Dovidio et al., 2007; van Bavel et al., 2020). A representative poll on attitudes toward refugees comparing data sampled during the COVID-19 pandemic lockdown with data collected 1 year earlier revealed mixed findings suggesting a rise in support of the general right to asylum, but also less willingness to accept refugees under the current circumstances (Ipsos MORI, 2020c). In light of these controversial findings, we investigate here nationwide pandemic lockdown-related changes in prejudice toward asylum-seekers in Germany using responses to a 16-item instrument (for details, see Method) that were collected immediately before and after the COVID-19 pandemic lockdown in spring 2020 in the same sample of participants. As the out-group of asylum-seekers has not been specifically associated with a higher incidence of COVID-19 infections, we can illuminate the pandemic lockdown's general effects on out-group prejudice.

Method

Participants

We contacted 235 healthy male participants who had participated in an online screening of our laboratory originally intended to recruit participants for experiments studying the neuroendocrinology of interactions between members of distinct natural social groups (created on the basis of low vs. high values of environmental concern and/or out-group prejudice; the BSI-18 is routinely included as a mental health screening measure in all our experiments). Due to potential confounds associated with hormonal variation in the menstrual cycle (for a recent review, see Kiesner et al., 2020) and the complexities associated with controlling for this variation in the experimental design, only male participants had been enrolled in the original project. These participants had been recruited via flyers that had announced the possibility to "participate in social interaction experiments" and had been distributed and posted on notice boards in the city center and in university buildings. Participants had been pre-screened to be free of current or previous history of

neurological, physical and psychiatric disorders, and alcohol or drug abuse. Moreover, the screening had included several psychosocial measures (see below for more details) and had been collected between November 2, 2019 and March 10, 2020. All these data were thus collected before the significant COVID-19 outbreak in Germany (The Robert-Koch-Institute monitoring the public health situation in Germany raised the risk assessment regarding COVID-19 in Germany from low to high on March 17; Robert Koch Institute, 2020). Of the 235 participants who had completed the psychosocial measure pre-pandemically, 142 (response rate: 60.43%) completed these measures a second time between April 21 and May 5 during the first pandemic nationwide lockdown in Germany in spring 2020 (first significant relaxation of physical distancing rules in Germany were announced on May 6; tagesschau.de, 2020). We excluded two of these participants from all further analyses due to a past COVID-19 infection, leaving a final sample of 140 participants (M_{age} = 24.23 years, SD = 4.19). Based on a sensitivity power analysis (α = .05, $1-\beta$ = 0.80, n = 140), this sample size enables the detection of small effect sizes (d = 0.24). We looked for differences between responding (N = 140) and non-responding participants (N = 93) that might hamper our findings' generalizability. Pre-pandemically, these two groups did not differ with respect to age, environmental concern, or out-group prejudice (all $ps > .20$), but non-responding participants reported higher levels of psychological distress (responders: M = 4.77, SD = 3.83; non-responders: M = 5.90, SD = 4.65; for details, see Measures below; $F(1, 231) = 4.10$, $p = .044$, $d = 0.26$). Thus, responding participants were very similar to non-responding participants apart from feeling slightly better before the COVID-19 pandemic started. We also checked whether early media reports on the first COVID-19 infections in Europe around the turn of the years 2019/2020 might have already affected pre-pandemic data collection in 2020. For that purpose, we compared the pre-pandemically collected psychosocial measures between participants who had completed these measures in 2019 (between November 2, and December 20; N = 76) and in 2020 (between January 7, and March 10, N = 64); no significant effects occurred (all $ps > .20$). Furthermore we added these two groups as a between-subjects factor "time point of pre-pandemic measurement" to the repeated-measures ANOVAs on changes in psychosocial measures (see Statistical analysis below); again, no significant effects occurred (all $ps > .20$ regarding interaction effects of "pandemic × time of pre-pandemic measurement"; all main effects of "pandemic" remained significant at $p < .042$). The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. Our local Ethics Committee approved the study.

Experimental Procedure

The link for participating in the online screening was posted on flyers throughout the city. The invitation for re-collecting psychosocial measures during the pandemic nationwide lockdown was sent via e-mail. After having signed the informed consent form, participants completed the psychosocial measures. Finally, they answered further questions regarding their worries during the COVID-19 pandemic. A subsample of participants also completed two further resource allocation tasks not analyzed in this study. The online screening lasted about 20 minutes; participants received 10.00€ for participating.

Measures

Psychological distress. The Brief Symptom Inventory 18 (BSI-18; Derogatis, 2000; German version; Franke, 2000) is a short version of the international questionnaire most used to assess *psychological distress*, the Symptom-Checklist 90 (Derogatis, 1977). It contains the scales somatization, depression, and anxiety (six items each; 0–24 points per scale), which together index general psychological distress (Global Severity Index, GSI: 0–72 points). Young healthy participants usually show GSI values of 5 or lower (Franke et al., 2017), with student populations having somehow higher values than non-student populations (Spitzer et al., 2011).

Environmental concern. We used the revised New Environmental Paradigm (NEP; Dunlap et al., 2000; German version: Schleyer-Lindenmann et al., 2018) which measures general beliefs about the relationship of human beings to the environment and which has become the most widely used measure of environmental attitudes (Hawcroft & Milfont, 2010). The NEP consists of 15 items and 5 scales (NEP sum score: 15–90 points; NEP subscale sum score: 3–18 points), that is, the reality of limits to growth (e.g., "We are approaching the limit of the number of people the earth can support"), anti-anthropocentrism (e.g., "Humans were meant to rule over the rest of nature", item reversed), the fragility of nature's balance (e.g., "The balance of nature is very delicate and easily upset"), anti-exemptionalism (e.g., "Despite our special abilities, humans are still subject to the laws of nature"), and the possibility of an ecocrisis ("If things continue on their present course, we will soon experience a major ecological catastrophe").

Prejudice against asylum-seekers. The Prejudice Against Asylum-Seekers Scale (PAAS; Anderson, 2018) is a 16-item instrument which differentiates between

classical and conditional prejudice. Classical prejudice represents the deliberate and unconcealed reporting of negative attitudes; for example, "asylum-seekers are a waste of time, money, and space." Conditional prejudice represents the more subtle and covert reporting of negative attitudes that are accompanied by a qualifying statement; for example, "asylum-seekers can enter our country as long as they abide our laws" (mean PAAS subscale: 1–7 points; Dovidio & Gaertner, 1986; Koc & Anderson, 2018).

Pandemic-related experiences. We asked participants about COVID-19-induced illnesses and whether they themselves or their reference persons had been quarantined. Furthermore we asked, on a 7-point Likert-type scale (1 = "never" to 7 = "always"), whether participants were worried about their health, the health of their reference persons, their job situation, their financial situation, their social relationships, the cohesion of our society, and the relationships of social groups.

Statistical Analysis

We analyzed nation-wide pandemic lockdown-related changes in psychosocial measures (i.e., mental health, environmental concern, out-group prejudice) using repeated-measures ANOVAs (within-subjects factor "pandemic" [pre, during]; within-subjects factor "scale" [BSI: 3 scales; NEP: 5 scales; PAAS: 2 scales]; we reduced the number of scales for calculating specific post-hoc tests; optional: between-subjects factor "group" [no quarantine or infected reference person vs. quarantine or infected reference persons]). To confirm the robustness of our statistical analyses, we also report findings from non-parametrical Wilcoxon tests (although ANOVAs should be robust against violations of the normality assumption in large samples). To assess associations of pandemic-related worries and changes in psychosocial measures, we calculated Pearson-correlations (we also report Spearman-correlations). For all statistical comparisons, p-values smaller than .05 were considered significant (two-tailed); regarding correlations, we applied Bonferroni correction (7 scales, 3 measures; $p = .00238$ [=.05/21]).

Results

Mental Health

By comparing the sum score of the BSI-18 (i.e., the global severity index, GSI) collected before and during the pandemic nationwide lockdown (for descriptive statistics of all analyzed variables see Table S1 in the Supplemental

Material), we detected significantly increased levels of psychological distress during the nation-wide pandemic lockdown (before vs. during: $F(1, 139) = 17.75$, $p < .001$, $d = 0.71$; non-parametric testing: $Z = -3.99$, $p < .001$; see Figure 1a). Next, we tested whether this global increase in psychological distress was due to specific increases in the BSI-18's "anxiety," "depression," and "somatization" subscales. Indeed, the pandemic's effects differed in size between subscales, as indicated by an interaction effect of "pandemic × subscale" ($F(1, 138) = 4.20$, $p = .017$, $d = 0.49$). There was a stronger pandemic-related increase in depression-related symptoms (before vs. during: $F(1, 139) = 18.42$, $p < .001$, $d = 0.73$; non-parametric testing: $Z = -4.27$, $p < .001$) than of anxiety-related (before vs. during: $F(1, 139) = 7.04$, $p = .009$, $d = 0.45$; non-parametric testing: $Z = -2.42$, $p = .016$; "depression" vs. "anxiety": $F(1, 139) = 6.24$, $p = .014$, $d = 0.42$) and somatization-related symptoms, with the latter not being higher than before the nation-wide pandemic lockdown (before vs. during: $F(1, 139) = 3.40$, $p = .067$, $d = 0.31$; non-parametric testing: $Z = -1.49$, $p = .138$; "depression" vs. "somatization": $F(1, 139) = 8.28$, $p = .005$, $d = 0.49$; "anxiety" vs. "somatization": $F(1, 139) = 1.26$, $p = .263$, $d = 0.19$).

Environmental Concern

Using the revised New Environmental Paradigm questionnaire (Dunlap et al., 2000) to assess environmental concern, we observed increased environmental concern during the pandemic nationwide lockdown (before vs. during: $F(1, 139) = 18.70$, $p < .001$, $d = 0.74$; non-parametric testing: $Z = -4.24$, $p < .001$; see Figure 1b). This global increase in environmental concern was mainly driven by increases in "the fragility of nature's balance" (before vs. during: $F(1, 139) = 7.02$, $p = .009$, $d = 0.45$; non-parametric testing: $Z = -2.55$, $p = .011$), "anti-exemptionalism" (before vs. during: $F(1, 139) = 14.11$, $p < .001$, $d = 0.64$; non-parametric testing: $Z = -3.46$, $p = .001$), and "possibility of an ecocrisis" subscales (before vs. during: $F(1, 139) = 13.63$, $p < .001$, $d = 0.63$; non-parametric testing: $Z = -3.87$, $p < .001$). There were no significant increases in the "limits of growth" (before vs. during: $F(1, 139) = 0.94$, $p = .335$, $d = 0.16$; non-parametric testing: $Z = -0.91$, $p = .360$) and "anti-anthropocentrism" subscales (before vs. during: $F(1, 139) = 0.04$, $p = .834$, $d = 0.04$; non-parametric testing: $Z = -0.32$, $p = .748$; interaction effect "pandemic × NEP scale": $F(4, 136) = 2.52$, $p = .044$, $d = 0.54$).

Out-Group Prejudice

The levels of out-group prejudice assessed via the Prejudice Against Asylum-Seekers Scale (Anderson, 2018) dropped during the pandemic nationwide

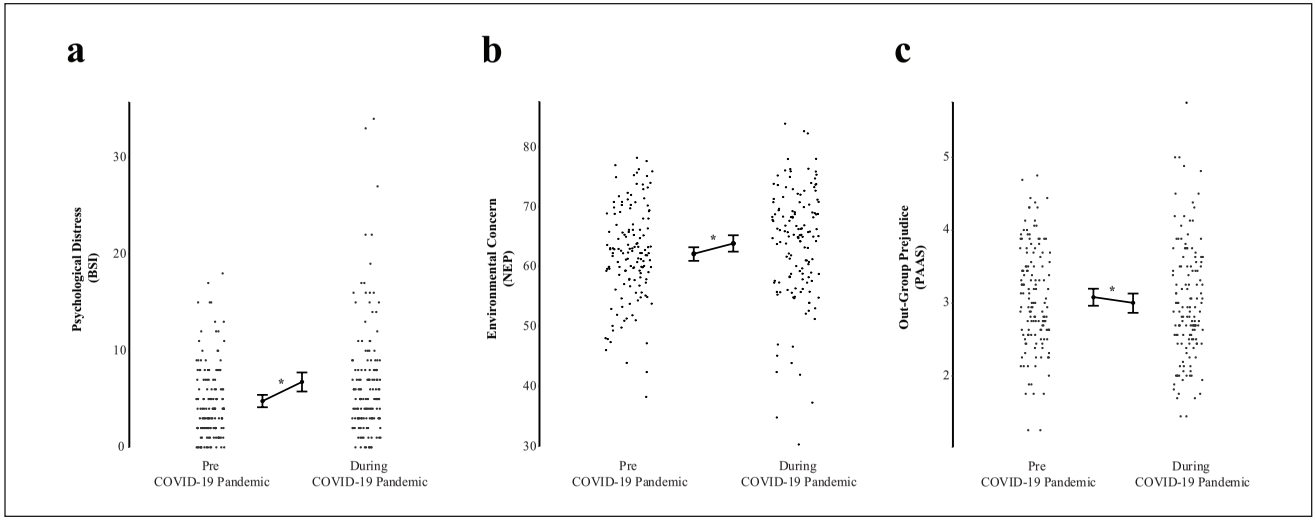

Figure 1. Changes in psychological distress, environmental concern, and out-group prejudice due to COVID-19 pandemic lockdown in spring 2020.

Note. In this figure there are shown mean values with 95% confidence intervals (a–c) and individual values (black dots) depicting differences in psychosocial measures collected in 140 healthy male participants before (on the left in each graph) and during (on the right in each graph) the COVID-19 pandemic nationwide lockdown. We observed significant increases in psychological distress ((a); shown are sum scores of the Brief Symptom Inventory-18; range: 0–72; Derogatis (2000); $p < .001$, d = 0.71), and in environmental concern ((b); shown are sum scores of the New Environmental Paradigm; range: 15–90; Dunlap et al. (2000); $p < .001$, $d = 0.74$), and a significant decrease in out-group prejudice ((c); shown are mean scores of the Prejudice Against Asylum-Seekers Scale; range: 1–7; Anderson (2018); $p = .039$, $d = 0.35$) during the COVID-19 pandemic nationwide lockdown.
*$p < .05$.

lockdown (before vs. during: $F(1, 139) = 4.33$, $p = .039$, $d = 0.35$; non-parametric testing: $Z = -2.01$, $p = .045$; see Figure 1c). We found no difference in the size of this decrease between the "classic prejudice" and "conditional prejudice" subscales of the PAAS (interaction effect "pandemic × PAAS subscale": $F(1, 139) = 0.99$, $p = .323$, $d = 0.01$).

Associations Between Psychosocial Measures, Pandemic-Related Worries and Experiences

We further analyzed the relationship between pandemic-related worries and changes in psychological distress, environmental concern, and out-group prejudice. We found that participants who worried more about their current job-related situation also reported larger increases in general psychological distress (psychological distress: $r(138) = .26$, $p = .002$, Bonferroni-corrected; $r_s(138) = .27$, $p = .002$, Bonferroni-corrected; for detailed results see Table S2 in the Supplemental Material).

Finally, and to control for potential effects of the actual or imagined threat of a COVID-19 infection, we compared people with ($N = 36$) and without ($N = 104$) any experience of having been quarantined or of having had infected reference persons. Adding these two groups as a between-subjects factor to all the above analyses revealed no group differences (interaction effect "pandemic × group"; psychological distress: $F(1, 138) = 0.12$, $p = .727$, $d = 0.06$; environmental concern $F(1, 138) = 0.17$, $p = .682$, $d = 0.07$; out-group prejudice: $F(1, 138) = 0.01$, $p = .981$, $d = 0.00$).

Discussion

This study investigated COVID-19 pandemic lockdown-related changes in mental health, environmental concern, and out-group prejudice by comparing data collected briefly before and during the first nationwide lockdown in spring 2020 in a German sample of healthy young male participants. These participants reported worsened mental health (medium-to-large effect size), increased environmental concern (medium-to-large effect size), and decreased out-group prejudice (small-to-medium effect size) during the pandemic lockdown. A participant having experienced quarantine or having had infected reference persons did not modulate these pandemic-related effects, suggesting that it is the general pandemic nationwide lockdown situation rather than specific individual threatening experiences with the disease that caused the observed changes. In sum, young males reacted to the COVID-19 pandemic lockdown by feeling distressed, but also by expressing greater concern for

the environment and disadvantaged others, suggesting that collectively facing and tackling a crisis enhances collective interests (Garcia & Rimé, 2019; Li et al., 2013; Maki et al., 2019).

Specifically, our findings demonstrate that coping with this crisis involves dealing with the general population's impaired mental health situation. While the COVID-19 patients obviously carry the heaviest psychological burdens (Iasevoli et al., 2020), as do people with infected relatives and friends, or those working in the mental health sector (Li et al., 2020; Romero et al., 2020; Wang et al., 2020), we find here that even healthy young men living in a country considerably less affected by the pandemic than others reported increased anxiety-related and depression-related symptoms. These findings match previous reports of increased rates of psychological distress and psychiatric disorders (e.g., depression, post-traumatic stress disorder) following other large-scale crises (Beaglehole et al., 2018; Tang et al., 2014). Although the mental health status remained subclinical in most participants—attesting to human nature's considerable resilience (Zacher and Rudolph, 2021)—the pandemic might therefore have more dramatic long-term consequences (Bonanno et al., 2010), if one fails to carefully monitor its potential detrimental effects on the general population's mental health and quickly help those people suffering from anxiety- or depression-related symptoms (Gruber et al., 2021). The observed mental health changes could be due to both effects of the pandemic (e.g., experiencing threat; van Bavel et al., 2020) or to effects of the pandemic nationwide lockdown (e.g., social isolation; Brooks et al., 2020; van Bavel et al., 2020). Interestingly, participants' impaired general mental health was associated with worrying about their job-related situation. Moreover, a closer look into associations of pandemic-related worries and the BSI subscales (at an uncorrected threshold) suggests that worries about one's own financial and job-related situation were positively associated with both increases in anxiety- and depression-related symptoms, while worries about one's own social relationships were positively associated with increases in depression-related symptoms (for details; see Supplemental Tables S2–S4). These findings suggest that the observed mental health changes were at least somewhat due to worries about the financial and social consequences of the pandemic's countermeasures now being implemented, rather than due to worries about health-related issues occurring during the pandemic.

This pandemic has not just induced worries about the economy; it has raised concern about the global environmental situation as well. Compared to before the nation-wide pandemic lockdown, participants thought of nature's balance as being more fragile, they evaluated the likelihood of an eco-crisis as more likely, and they rejected that humans need not be concerned about environmental problems. Interestingly, the pandemic's effects were thus

restricted to those NEP subscales that relate to the environment's vulnerability. Furthermore, pandemic-related worries were unrelated to these changes, suggesting that the changes were not driven by worries regarding one's individual situation, but rather by worries regarding the general state of the environment. The pandemic with its global reach might raise environmental concern by making us more aware that human control over the world is limited (van Bavel et al., 2020) and that we live in an ailing ecosystem in which pandemics are now more likely to occur (Maillard & Gonzalez, 2006). Alternatively or additionally, the pandemic might be strengthening our feeling of connectedness to nature thanks to spending more time in it in the absence of social activities during lockdown (Alcock et al., 2020). These findings suggest that efforts to make environmental protection a priority after recovering from the COVID-19 situation might find broad approval, although many people are worried about their current economic situation. Thus, with all the challenges the pandemic has raised, it might also give us the opportunity to drive forward serious handling of climate change by changing environmentally harmful pre-pandemic lifestyles, potentially in a way that reconciles economic and environmental issues.

Finally, our study allows us to analyze the effects of the pandemic on prejudices against asylum-seekers. While increased discrimination against Asian individuals has been reported (Devakumar et al., 2020), our data do not show a general increase in discrimination against the asylum-seeking outgroup in Germany. On the contrary, we observed that, on average, the pandemic has lowered prejudice against asylum-seekers, although the size of the effect on this variable was half that of the effects on the other two studied variables. As we found no relationship between pandemic-related worries and reduced prejudices against asylum-seekers, it is not pandemic-induced worries, but probably other psychological processes (e.g., stronger feeling of a common fate, and belonging to a "superordinate category"; Dovidio et al., 2007; van Bavel et al., 2020) that might be responsible for this effect. In sum, these results support assumptions that coordinated efforts to handle the pandemic might dilute in- out-group distinctions within our society (Dovidio et al., 2007; Sibley et al., 2020; van Bavel et al., 2020). These results also fit well with recent evidence showing that, during the lockdown in New Zealand, people felt a greater sense of community (Sibley et al., 2020). Moreover, and triggered by the police killing of the Black American George Floyd, global protests against racial discrimination have arisen (The Lancet, 2020) *during* the pandemic, also suggesting that its circumstances might at the very least not hinder, they may even promote caring for out-group members.

The present study's follow-up longitudinal design has enabled us to carefully draw inferences on the pandemic lockdown's psychosocial effects,

keeping in mind that the observed effects could be affected by (unmeasured) changes in other variables (e.g., time of the year, political events). However, given that the pandemic is still raging world-wide, it is impossible to compare changes in the variables we analyzed with their changes in a control group of people not experiencing a pandemic, rendering studies of quasi-experimental design the best available source of evidence from a methodological perspective. As a further limitation, the present study relies on a comparatively small sample of male participants, but one that stands out due to the careful inclusion of physically and mentally healthy people and a high response rate during the pandemic nationwide lockdown, thus lowering the risk of selective responding by a subgroup of people. Moreover, we could show that responders did not differ from non-responders with regard to environmental concern and out-group prejudice before the nation-wide pandemic lockdown—the only difference was that non-responding participants felt slightly worse (for details see Methods). Therefore, and considering that mental health impairments might be even worse in COVID-19 survivors (Mazza et al., 2020) and in people with pre-existing (mental) health problems (Gobbi et al., 2020; Horesh et al., 2020), it is possible we may have even underestimated the worsening pandemic-related mental health effect in our study. Alternatively, as our participants were comparatively healthy, they might have had more potential to deteriorate, meaning that our study could also have overestimated these effects. Other studies may investigate whether gender and age moderate the pandemic's psychosocial effects, as some studies have shown stronger effects in females, young adults (18–30 years) and the elderly (>60 years; Luo et al., 2020; Mazza et al., 2020; Pierce et al., 2020). One should also consider that the pandemic's psychosocial effects might be dynamic and regionally specific—given that we observed our effects in a country that was during this time less severely affected by the pandemic than other countries, it is possible that these effects would even be stronger in other places.

In sum, the present study demonstrates that this pandemic might represent a mental health risk even for people not infected by COVID-19 themselves. Furthermore, our study provides insights into the pandemic's spillover effects on the handling of two other major world-wide crises, namely climate change and mass migration. During the pandemic nationwide lockdown, people have reported greater environmental concern and less out-group prejudice. Thus, these findings indicate that the pandemic might open doors to transfer pandemic-induced changes in psychological attitudes into changes in actual behavior (Langenbach et al., 2020) in a way that improves how we treat our environment and others after the pandemic.

Declaration of Conflicting Interests

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Supplemental Material

Supplemental material for this article is available online.

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