



## Research article

## Did concern about COVID-19 drain from a 'finite pool of worry' for climate change? Results from longitudinal panel data

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## ABSTRACT

According to the 'finite pool of worry' hypothesis, one may expect that introducing a novel concern (e.g., about a pandemic) may reduce concern about an existing issue (e.g., about climate change). Drawing upon representative longitudinal panel data from Norway ( $N = 7998$ ), this paper explores if and how worry about climate change changed from January 2020 (before COVID-19 was detected in Norway) to January 2021 (during one of the pandemic waves). The current analyses indicate a small but significant decrease in worry about climate change among the general public during this time interval, in particular among respondents born before 1980. However, the change in climate change worry did not correlate with worrying about personally becoming infected with COVID-19 or with family members being infected. Thus, the results do not indicate a mechanism of worrying about COVID-19 infections leading to a decrease in people's worry about climate change. The findings are discussed in relation to empirical evidence from other countries, where climate change risk perceptions have been monitored during the recent pandemic. Possible explanations for observed differences in worry about climate change, as well as the lack of correlation between the change in climate change worry and worry about COVID-19, are discussed.

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## 1. Introduction

The 'finite pool of worry' hypothesis [1] postulates that people have limited emotional resources to deal with challenges in their lives and that increased worry for one issue will consequently result in reduced worry for another issue [2]. Due to the presumed limits of the pool of worry, perceived risks might have to be prioritized, and immediate and present threats are likely to cause more concern than threats with more obscure or distant causes and consequences [1]. It can be argued that the emergence of a pandemic threat may thus supplant the issue of climate change. In line with this argument, previous studies have found that climate change is assigned a lower priority relative to other pressing societal issues [3].

Research on the finite pool of worry has shown that concern about climate change may decrease when the political risk is perceived to be high [4], during times of economic recession [5–7], or in response to experiencing a hazard such as flooding [8]. Increased anxiety about specific hazards (e.g., a nuclear plant accident) may coincide with

both reduced anxiety about global warming and seemingly unrelated hazards (e.g., chemical food additives [9]).

Recently, Bostrom et al. [10] conducted an online survey experiment among a sample of internet users from the United States to show that the context in which risk judgments are made shapes support for policies addressing the threat in question. People tended to support policies related to the threat they were currently focusing on, in this particular case climate change or the COVID-19 pandemic. The authors interpreted this as evidence for a finite worry pool. Another study by Evensen et al. [11] found a slight increase in the UK public's beliefs in human-caused climate change from 2019 to 2020. They conclude that concern about climate change was relatively unaffected by the arrival of the pandemic, thereby reporting a lack of evidence for a 'finite pool of worry'.

The current study investigates whether worry about climate change decreased among the Norwegian public when the COVID-19 pandemic commenced. This research was done in response to calls for more research on how the pandemic may have changed peoples' concerns, including research from other national contexts [11]. We analyzed representative longitudinal panel data that were collected before and after the coronavirus was detected in Norway. In addition to exploring changes in worry about climate change within the

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**Table 1**  
Means and standard deviations for worry about climate change.

	n	January 2020		January 2021		$M_{diff}$	t	p	df	Cohen's d
		M	SD	M	SD					
Year of birth										
1939 or earlier	226	3.58	1.08	3.43	1.07	-.15	-2.80	.006	225	.136
1940 – 1949	1508	3.47	1.05	3.29	1.03	-.18	-10.14	<.001	1507	.175
1950 – 1959	2134	3.52	1.06	3.36	1.05	-.16	-10.20	<.001	2133	.150
1960 – 1969	1767	3.40	1.11	3.24	1.09	-.17	-9.85	<.001	1766	.153
1970 – 1979	1169	3.45	1.15	3.35	1.17	-.10	-4.84	<.001	1168	.089
1980 – 1989	714	3.65	1.11	3.58	1.16	-.07	-2.38	.017	713	.059
1990 or later	480	3.84	1.09	3.90	1.00	.07	2.11	.036	479	-.065
Gender										
Male	4108	3.30	1.14	3.18	1.12	-.13	-11.00	<.001	4107	.111
Female	3890	3.72	0.99	3.58	1.02	-.14	-12.64	<.001	3889	.143
Total	7998	3.51	1.09	3.37	1.09	-.14	-16.67	<.001	7997	.123

Note. The statistics reported above reflect an unweighted description of the respondents who answered items about climate change worry in both years. Cohen's d uses the sample standard deviation of the mean difference adjusted by the correlation between measures. The response scale ranged from 1 to 5. The alpha level was Bonferroni corrected at  $p = .007$  (for age) and  $p = .025$  (for gender).

broader public, our analyses focused on whether these findings generalize across demographic groups. We investigated potential differences between age groups, since older people were more at risk for severe COVID-19 disease [12], and between gender groups since women are arguably more likely to encounter potentially infectious situations due to them being overrepresented in healthcare professions [13]. We further investigated the degree to which possible changes in worry about climate change were associated with worrying about COVID-19 infections (henceforth referred to as coronavirus infections).

## 2. Materials and methods

The Norwegian Citizen Panel (NCP; <https://www.uib.no/en/citizen>) is a web-based survey that has measured Norwegians' opinions toward important societal matters, including climate change, between two to three times each year since 2013. Members of the panel are recruited to be representative of the adult Norwegian population.

In the current paper, we analyze longitudinal survey responses from the NCP collected in January 2020 and January 2021, using only respondents ( $N = 7998$ ) who answered the question on worry about climate change at both time points<sup>1</sup>. In January 2021, a subsample ( $N = 2065$ ) also answered two questions on worry about a coronavirus infection. We analyzed this subsample to test the relationship between worry about climate change and worry about coronavirus infection.

Worry about climate change was measured identically in both data collection rounds by asking the following question: "How worried are you about climate change?". Respondents were asked to provide their answer on a 5-point scale ranging from 1 (*Not at all worried*) to 5 (*Extremely worried*). Worry about being infected with the coronavirus was measured with two questions: "I worry that I will get infected with the coronavirus." and "I worry that someone in my family will get infected with the coronavirus". Respondents responded to each statement using a 5-point scale ranging from 1 (*Completely disagree*) to 5 (*Completely agree*)<sup>2</sup>.

<sup>1</sup> The number of respondents who initially answered the question about worry about climate change was substantially higher than the sample entering our analysis due to attrition from January 2020 to January 2021.

<sup>2</sup> The coronavirus measures were taken as part of the PANDRISK research project; see <https://www.uib.no/en/pandrisk> for more information.

Information about age and gender is based on what respondents reported in January 2021.

## 3. Results

A paired-samples *t*-test was conducted to investigate self-reported levels of worry about climate change over time, which was followed up by additional tests focusing on specific demographic groups (see Table 1). To correct for testing mean differences between the two time points across multiple groups, we adjusted the alpha level (Bonferroni correction) from  $p = .05$  to  $p = .007$  (for age) and  $p = .025$  (for gender).

Results from these analyses indicate a statistically significant but small decrease in the public's worry about climate change from January 2020 (before the pandemic arrived in Norway) to January 2021 (about ten months after the pandemic arrived in Norway and while it remained to be an issue of major concern in the public debate)<sup>3</sup>. The trend was consistent and statistically significant for both male and female respondents, and in most age groups, with the exception of those born after 1979. For the two youngest age groups, the change in worry did not reach the Bonferroni corrected alpha level of significance.

The results from the *t*-tests were followed up by a one-way ANOVA to examine the potential differences between age groups. A difference score, reflecting the decrease in climate change worry from January 2020 to January 2021, was calculated and used as the dependent variable. The analysis showed a significant difference in the difference score between age groups,  $F(6, 7991) = 9.90, p < .001$ . Post hoc analyses using Tukey's post-hoc test showed that the youngest age group (born 1990 or later) was significantly different from all other age groups at the  $p = .05$  level. Further, the age group 1980 – 1989 was different from those born 1990 and later, those born 1960 – 1969, and those born 1940 – 1949. No other age groups were significantly different from each other concerning the magnitude of their respective difference score<sup>4</sup>.

<sup>3</sup> We also find a reduction in climate change worry when looking at the means of the full samples for 2020 ( $M = 3.48, N = 11310$ ) and 2021 ( $M = 3.39, N = 10375$ ).

When comparing the respondents who continued into the 2021 sample ( $n = 7998$ ) and those who did not ( $n = 3285$ ), we find that worry about climate change in 2020 was somewhat higher among those who continued ( $M = 3.51, SD = 1.09$ ) compared to those who did not ( $M = 3.43, SD = 1.10; t(11281) = 3.45, p < .001$ , two-tailed).

<sup>4</sup> The means of the difference score for the age groups correspond to the differences between the means of the two time points in Table 1, column  $M_{diff}$ .

**Table 2**  
Means and standard deviations for worry about a coronavirus infection.

	n	Worry about becoming infected yourself		Worry about family member being infected	
		M	SD	M	SD
Year of birth					
1939 or earlier	53	2.57	1.07	3.15	1.10
1940 – 1949	427	2.83	1.09	3.39	1.04
1950 – 1959	560	2.83	1.07	3.43	1.07
1960 – 1969	450	2.73	1.07	3.47	1.11
1970 – 1979	278	2.51	1.09	3.32	1.18
1980 – 1989	180	2.64	1.16	3.52	1.11
1990 or later	117	2.68	1.17	3.76	1.15
Gender					
Male	1066	2.61	1.08	3.28	1.12
Female	999	2.87	1.09	3.60	1.06
Total	2065	2.73	0.73	3.43	1.10

Note. The statistics reported above reflect an unweighted description of the respondents who answered items about climate change worry in both years as well as about worry concerning a coronavirus infection in January 2021. Response scales ranged from 1 to 5.

The extent to which people expressed worry about personal infection with the coronavirus was rather low across all age groups that were surveyed in January 2021, while worry about having members of their family infected was somewhat higher (see Table 2). Our results indicate that those born in 1980 and later, who did not show a decrease in climate change worry during the pandemic, were no less worried about the coronavirus than most other age groups. Further, independent samples *t*-tests (two-tailed) showed that the reduction of worry about climate change was not significantly different between men ( $M = -0.13, SD = 0.73$ ) and women ( $M = -0.14, SD = 0.71; t(7996) = 1.08, p = .283$ ). On the other hand, women ( $M = 2.87, SD = 1.09$ ) were more worried about being infected than men were ( $M = 2.62, SD = 1.08; t(2189) = -5.45, p < .001$ ). Women ( $M = 3.61, SD = 1.05$ ) were also more worried about members of their family being infected with the coronavirus compared to how worried men were about this ( $M = 3.29, SD = 1.12; t(2188.49) = -7.06, p < .001$ ).

To test whether worry about a coronavirus infection was associated with the decline in climate change worry, we conducted additional correlation analyses among the respondents who answered items on climate change worry in both data collection rounds as well as items on worry about a coronavirus infection in January 2021 ( $N = 2065$ ). The previously obtained climate change worry difference score was not significantly correlated with worrying about personal infection, nor with worrying about an infection in the family. The correlation between worry about climate change and worry about getting infected with the coronavirus was weak and positive for concern about becoming infected oneself, as well as for concern for family members being infected (see Table 3).

#### 4. Discussion

If humans have a ‘finite pool of worry’, as it has been argued, increased concern about the coronavirus might reduce the capacity to worry about climate change. However, the empirical literature on the subject has been mixed [10,11]. Our results did indicate a decrease in worry about climate change from before (January 2020) to during (January 2021) the pandemic in Norway. However, the magnitude of these changes differed across age groups. While there was a significant decrease in worry about climate change among older respondents (born 1979 or earlier), the analyses showed no significant change among younger respondents (born 1980 or later). Additional analyses suggest that although a substantial share of the public was becoming less worried about climate change during the investigated time interval, this decrease does not seem to be directly attributable to worrying about coronavirus infection, at least according to the current data.

While worry about infection was not significantly associated with the change in climate change worry, there was a weak positive association between the level of infection worry and climate change worry in January 2021. Positive associations between climate change and coronavirus concerns have also been found in other recent longitudinal studies [14,15]. This may be due to a general propensity to worry about threats in general [16] and there is emerging evidence to suggest that concerns about the pandemic may indeed have reinforced awareness towards and concerns about climate change [15]. In line with this, survey results from the second half of 2021 show that worry about climate change reached an all-time high in several countries [17,18], including Norway [19].

**Table 3**  
Bivariate correlations.

	Worry about climate change 2020	Worry about climate change 2021	Difference score 2020-2021	Worry about being personally infected 2021	Worry about family members being infected 2021
Worry about climate change 2020	—				
Worry about climate change 2021	.780***	—			
Difference score 2020-2021	-.346***	.317***	—		
Worry about a coronavirus infection (personal) 2021	.167***	.168***	.000	—	
Worry about a coronavirus infection (family) 2021	.182***	.203***	.029	.650***	—

Note. Listwise deletion,  $N = 2065$ . Pearson correlations (two-tailed). The difference score was computed by subtracting ratings on climate change worry measured in January 2021 from the same type of ratings that were obtained in January 2020.

\*\*\*  $p < .001$ .

Our respondents did not show very pronounced worry about the coronavirus, especially with regards to becoming infected themselves. Infection worry may thus have had only a minimal effect in draining from a 'finite pool of worry'. It should be noted that our analyses only include worry at two time points. Since the information available to the public varied over the course of the pandemic, caution is warranted towards generalizing the current findings beyond the investigated time interval.

One aspect associated with the finite pool of worry is emotional numbing [20], which is a coping mechanism that might occur when people are exposed to repeated threats over a short period of time. In our study, worry about coronavirus infections was measured in January 2021. At this point, several infection waves and related media coverage could have led to emotional numbing, and thereby reduced worry compared to earlier in the pandemic. Furthermore, it is possible that people who were very worried about climate change in the period between 2020 and 2021 might have had limited capacity to adopt high worry about the pandemic.

Another aspect of the 'finite pool of worry' hypothesis highlights that attention toward a threat tends to decrease over time unless people are given reasons to uphold their interest [20]. It has been suggested elsewhere [14] that a shift in media coverage and public debate away from climate change issues during the pandemic might explain the reduction in climate change worry. Attention shifts could explain why we see a reduction although it is not directly linked to increased levels of worry about the coronavirus. Thus, it remains unclear whether increased infection worry causes decreased climate change worry, or whether changes observed in other studies may be due to factors such as changes in attention.

Our results showed that people were on average more worried about their family members being infected with the coronavirus than about themselves being infected [21]. The pandemic could also entail additional concerns, for instance with respect to job security and the economy, that could be related to the changes in climate change worry. Although the current study assumes that the pandemic increases concerns, it does not measure whether the 'pool of worry' is at or near its capacity limit. People could theoretically have reduced their worry about issues other than climate change during the pandemic without compromising worry about climate change or the coronavirus. Forthcoming studies that follow up on our current findings could explore what relative importance other types of worry could have with regards to a potential 'finite pool of worry', and explore ways to more fully test the ideas of a limited capacity for worry. Particularly informative comparison cases could be established by examining such effects in representative samples from countries where the consequences of the pandemic have been quite severe<sup>5</sup>.

## 5. Conclusion

The reported analyses compared longitudinal panel data from before and during the coronavirus pandemic. While there was an overall small decrease in climate change worry, this change was unrelated to infection worry.

## Statements & declarations

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<sup>5</sup> Both the number of reported cases as well as the number of COVID-19 related deaths have remained relatively low in Norway throughout the time in which the data for this study were collected [22].

## Author Contributions

All authors contributed to the study conception and design. Data analysis was performed by Thea Gregersen. The first draft of the manuscript was written by Thea Gregersen and all authors edited and commented on previous versions of the manuscript. All authors read and approved the final manuscript.

## Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Declaration of Competing Interests

The authors have no relevant financial or non-financial interests to disclose.

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