Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey

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Summary

Background Climate change has important implications for the health and futures of children and young people, yet they have little power to limit its harm, making them vulnerable to climate anxiety. This is the first large-scale investigation of climate anxiety in children and young people globally and its relationship with perceived government response.

Methods We surveyed 10 000 children and young people (aged 16–25 years) in ten countries (Australia, Brazil, Finland, France, India, Nigeria, Philippines, Portugal, the UK, and the USA; 1000 participants per country). Invitations to complete the survey were sent via the platform Kantar between May 18 and June 7, 2021. Data were collected on participants' thoughts and feelings about climate change, and government responses to climate change. Descriptive statistics were calculated for each aspect of climate anxiety, and Pearson's correlation analysis was done to evaluate whether climate-related distress, functioning, and negative beliefs about climate change were linked to thoughts and feelings about government response.

Findings Respondents across all countries were worried about climate change (59% were very or extremely worried and 84% were at least moderately worried). More than 50% reported each of the following emotions: sad, anxious, angry, powerless, helpless, and guilty. More than 45% of respondents said their feelings about climate change negatively affected their daily life and functioning, and many reported a high number of negative thoughts about climate change (eg, 75% said that they think the future is frightening and 83% said that they think people have failed to take care of the planet). Respondents rated governmental responses to climate change negatively and reported greater feelings of betrayal than of reassurance. Climate anxiety and distress were correlated with perceived inadequate government response and associated feelings of betrayal.

Interpretation Climate anxiety and dissatisfaction with government responses are widespread in children and young people in countries across the world and impact their daily functioning. A perceived failure by governments to respond to the climate crisis is associated with increased distress. There is an urgent need for further research into the emotional impact of climate change on children and young people and for governments to validate their distress by taking urgent action on climate change.

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Introduction

Climate anxiety and eco-anxiety (distress relating to the climate and ecological crises) are gaining attention worldwide as people become increasingly aware of the current and future global threats associated with our warming planet.[1] The climate crisis has important long-term implications for physical and mental health as a result of acute and chronic environmental changes, from storms and wildfires to changing landscapes, and increasing temperatures.[2] Climate anxiety is complex,[3] and is recognised to often be based on constructive or practical anxiety.[1] Although painful and distressing, climate anxiety is rational and does not imply mental illness. Anxiety is an emotion that alerts us to danger, which can cause us to search for more information about the situation and find potential solutions. In threatening and uncertain situations such as the climate crisis, this response can be seen as what is sometimes referred to as practical anxiety[1,4] because it has the beneficial effect of leading people to reassess their behaviour in order to respond appropriately. However, because the climate crisis is so complex and lacks a clear solution, anxiety can easily become too intense and even overwhelming.[5–7]

Climate anxiety can be connected to many emotions, including worry,[8] fear,[9] anger,[10] grief, despair, guilt, and shame,[11] as well as hope,[12] although the presence of these vary between individuals. As research in this field emerges, certain emotions have received more attention,

Research in context

Evidence before this study

Previous studies have shown that psychological distress about climate change exists, with affective, cognitive, and behavioural dimensions. The direct impacts of climate change disproportionately burden children and young people, at the same time as they are developing psychologically, physically, socially, and neurologically. Emerging evidence suggests that young people are also more burdened by the indirect impacts of climate change, such as climate anxiety, which affects psychosocial health and wellbeing, and might exacerbate pre-existing mental health problems in some children. Before the study (between 2016 and 2021), several of the coauthors had conducted a range of conceptually guided explorations of the scarce literature on children's emotions in relation to climate change, and existing psychological measures of climate anxiety, in English and Finnish. Findings from these searches, and resulting publications, inform this study. We also considered legal reports from the past 2 years relating to human rights and climate change.

Added value of this study

To our knowledge, this is the largest and most international survey of climate anxiety in children and young people to date. It shows that the psychological (emotional, cognitive, social, and functional) burdens of climate change are being felt by large proportions of young people around the world. Furthermore, it is the first study to offer insight into how young people's perception of governments' responses to climate change is associated with their own emotional and psychological reactions. These reactions are reported by young people from a diverse set of countries with a range of incomes and differing levels of direct exposure to severe effects of climate change.

Implications of all the available evidence

Distress about climate change is associated with young people perceiving that they have no future, that humanity is doomed, and that governments are failing to respond adequately, and with feelings of betrayal and abandonment by governments and adults. Climate change and government inaction are chronic stressors that could have considerable, long-lasting, and incremental negative implications for the mental health of children and young people. The failure of governments to adequately address climate change and the impact on younger generations potentially constitutes moral injury. Nations must respond to protect the mental health of children and young people by engaging in ethical, collective, policy-based action against climate change.

especially climate grief, worry, and fear, tied to current and anticipated losses. Research into other emotions has only begun more recently, such as how people might feel guilty for their own contributions to climate change or feel shame about the climate damage caused by humanity more broadly. Complex and sometimes competing feelings are often experienced together and can fluctuate in response to personal and world events.[13,14] These experiences have been argued to be understandable, congruent, and healthy responses to the threats we face, but such threats can be experienced as an unremitting psychological stressor.[1,3]

Substantial levels of climate-related distress are reported globally,[15] with children and young people particularly vulnerable.[16] This distress is understandable, given that a 2021 review found that children of present and future generations will bear an unacceptably high disease burden from climate change,[17] and a 2021 UNICEF report estimates that one billion children are at extremely high risk as a result.[18] Qualitative research has found that many children have pessimistic views of climate futures.[19] Interviews conducted with children in various countries between 2016 and 2021 found intense forms of climate and eco-anxiety.[3,13] Parents and educators also report hearing great concern about climate change from young people.[20,21] Quantitative research on a global scale is missing but is vital considering that contemporary children will live with the climate crisis for their whole lives.

Climate change poses a risk to mental health that can be understood through stress–vulnerability models of health.[22] Exposure to chronic stress in childhood has a long-lasting impact and increases the risk of developing mental health problems. Understanding the stress of climate change requires understanding how multiple factors interact. Changing climate and weather-related disasters have diverse impacts, both direct (eg, destruction and trauma) and indirect (eg, strained personal and public resources, interrupted community functioning),[2] as well as resulting in climate anxiety. Children and young people are thus facing numerous stressors but have few resources to mitigate or avoid them. This experience is compounded by additional psychosocial risk factors, such as inadequate social services for many children around the world.[23] Children facing a future severely damaged by climate change will need support.[24]

The psychological stress of climate change is also grounded in relational factors; studies among children have shown that they often experience an additional layer of confusion, betrayal, and abandonment because of adult inaction towards climate change.[3,25] Children are now turning to legal action based on government failure to protect ecosystems, young citizens, and their futures.[26] Failure of governments to protect them from harm from climate change could be argued to be a failure of human rights and a failure of ethical responsibility to care,[27] leading to moral injury (the distressing psychological aftermath experienced when one perpetrates or witnesses actions that violate moral or core beliefs).[28] This might include an awareness of or failure to prevent harmful unethical behaviour. Research is required to understand

the relationship between children and young people's climate anxiety and their feelings about the adequacy of governmental response.

This study aimed to better understand the feelings, thoughts, and functional impacts associated with climate change among young people globally. It explores and discusses the relationships between climate-related distress and perceived government responses. We aimed to answer the following research questions: how children and young people around the world report emotional, cognitive, and functional responses to climate change; how children and young people around the world perceive governmental responses to climate change and whether those perceptions suggest feelings of betrayal or of reassurance; and whether relationships exist between the cognitive and emotional responses to climate change and the perceptions of governmental responses.

Methods

Study design and participants

Data were collected from 10 000 young people via the participant recruitment platform Kantar. Participants were drawn from Kantar's LifePoints online research panel (45 million people from 42 countries in 26 languages). Additional respondents were sourced from other double opt-in panels (ie, after registering to join a panel, respondents are required to click on a confirmation email) in the Kantar network in some countries (appendix p 2). The LifePoints panel draws membership from anyone who voluntarily signs up, as long as they pass quality checks that detect fraudulent panellists. Kantar uses a diverse set of recruitment sources (opt-in email, co-registration, e-newsletter campaigns, internal and external affiliate networks, and social media) specifically to maximise inclusivity. All panel members are reminded at regular intervals to complete surveys as part of their membership and to collect points.

For this study, participants were eligible if they were aged 16–25 years and living in one of the ten countries selected (Australia, Brazil, Finland, France, India, Nigeria, Philippines, Portugal, the UK, and the USA). These countries were chosen to reflect populations from different countries, representing a range of cultures, incomes, climates, climate vulnerabilities, and exposure to differing intensities of climate-related events.

Invitations to participate were available to eligible panellists between May 18 and June 7, 2021. Before accessing surveys, participants were informed of the survey length but not the topic. 15 543 people began the survey and 10 000 (68%) completed it. Data quality tools removed fraudulent survey data, such as from respondents who attempted to complete the survey multiple times, or those completing it far more quickly than the average. Data collection ended in each country once 1000 complete, anonymised responses were obtained. Quota sampling was used, based on age, gender, and region. There was an approximately even split in terms of gender (51·4% male, 48·6% female) and age group (49% aged 16–20; 51% aged 21–25 years; mean age 20·82 years [SD 2·54]; appendix p 2). Because quota sampling did not lead to complete representativeness by country, collected data were weighted based on statistics from the Organisation for Economic Co-operation and Development for each country by age group, gender, and region. All reported findings are based on these weighted data. The study was approved by the University of Bath Psychology Ethics Committee (#21-090).

Procedures

A survey was developed by 11 international consultants with expertise in climate change emotions, clinical and environmental psychology, psychotherapy, psychiatry, human rights law, child and adolescent mental health, and young people with lived experience of climate anxiety. The group met weekly for 2 months (February to March, 2021), reviewing existing climate anxiety measures and evidence for the psychological impact on young people. Several of the main authors had recently completed and published articles with targeted literature searches into climate and eco-anxiety,[1,4,6] which were synthesised and used to generate survey items. These were discussed and refined iteratively, leading to eight broad questions about emotional, functional, and psychological experiences related to climate change and governmental response. The survey was piloted with 17 young people, with resulting adjustments to language and scaling. The survey domains were: climate-related worry (level of worry about climate change); climate-related functional impact (feelings about climate change negatively affecting functioning); climate-related emotions (presence of 14 positive and negative key emotions about climate change); climate-related thoughts (presence of seven key negative thoughts about climate change); experience of being ignored or dismissed when talking about climate change; beliefs about government response to climate change (presence of nine positive and negative key beliefs); and emotional impact of government response to climate change (presence and intensity of feelings related to reassurance and betrayal). The individual questions are shown in the appendix (pp 3–4). Items were developed to be clear and have appropriate equivalents in different cultures and languages, and they were translated as required.

See Online for appendix

Statistical analysis

Descriptive statistics were calculated for the following constructs: worry, climate-related functional impairment, climate-related emotions, negative thoughts about climate change, experience of having one's climate change concerns dismissed, and beliefs about and emotional impact of governmental responses to climate change. Differences between the countries were cautiously explored. Pearson's correlation analysis was

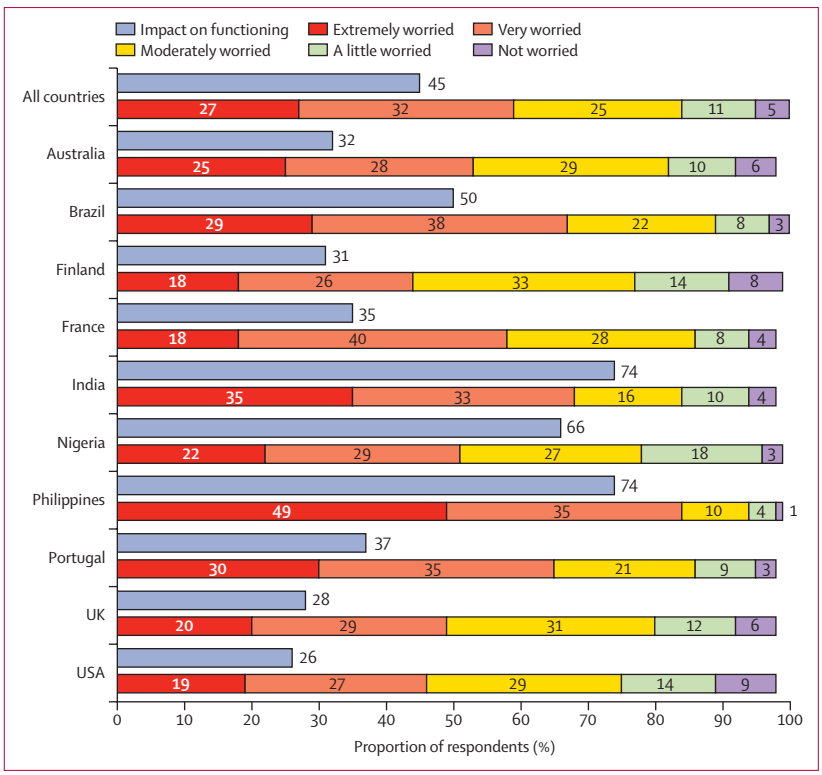

Figure 1: **Worry about climate change and impact on functioning**
The graph shows the proportion of the sample reporting a negative impact on functioning from their feelings about climate change and various levels of worry about climate change. Data are shown for the whole sample (n=10 000) and by country (n=1000 per country)

done to explore whether climate-related distress, functioning, and negative beliefs about climate change were linked to thoughts and feelings about government response.

To allow for comparison between constructs, scales were made from items within each domain (climate-related thoughts, beliefs about government response, emotional impact of government response). Negative thoughts about climate change were summed to create an overall score (ranging from 0 to 7), based on evidence that people with higher levels of concern about climate change tend to report more negative thoughts.[29] Perceptions that government has failed to respond adequately were recorded and summed to form a variable called negative beliefs about government response. Nine statements were included, each of which was scored 1 or 2. Items were reverse-coded such that a higher number always indicated a more negative evaluation of the government's response (ie, 9 was the most positive possible response and 18 was the most negative possible response).

Emotional impacts of government response were split into two scales reflecting a positive or a negative emotional response. The reassurance scale was constructed from the mean of the four positive feelings items scored on a scale from 1 to 5 ("I am reassured by governments' action on climate change" and each of "When I think about how my government is or how other governments are responding to climate change I feel valued/protected/hopeful"). Cronbach's α was 0·82. The betrayal scale was constructed from the mean of the six negative feelings items scored on a scale from 1 to 5 ("When I think about how my government is or how other governments are responding to climate change I feel anguished/abandoned/afraid/angry/ashamed/belittled"). Cronbach's α was 0·89. The label betrayal scale was chosen because it reflects the type of distress commonly experienced (anger, anxiety, anguish, and so on) when individuals are harmed by deliberate acts of omission or perpetration by the institutions upon which they rely for support, protection, or even survival.[30]

Questions regarding government action were phrased broadly as "my government is/other governments are" in order to assess how children and young people experience global inaction by governments in power. Even if their own country was perceived to be responding well, negative thoughts and feelings would persist if other countries were ignoring or downplaying climate change. By allowing respondents to indicate dissatisfaction or distress towards governments generally (rather than tied to their own government), it was felt that individuals could answer more openly, regardless of country of residence.

We report aggregate results for all respondents, and results by country. Aggregated results combining all countries are offered to provide a picture of the overall findings, while recognising that such results are not globally representative because sample sizes were the same for each country and not weighted by population size. Due to the size of the sample and number of comparisons, we only report findings that are significant at the p≤0·001 level. All analyses were conducted using SPSS version 27.

Role of the funding source

AVAAZ arranged for data collection to be conducted by Kantar. It had no role in data analysis, data interpretation, or writing of the report.

Results

In response to our first research question, which was how children and young people around the world report emotional, cognitive, and functional responses to climate change, respondents across all countries reported a large amount of worry, with almost 60% saying they felt "very" or "extremely" worried about climate change (mean score of 3·7 on a scale from 1 to 5 [SD 1·7]). More than 45% of respondents said their feelings about climate change negatively affected their daily lives; the proportion of respondents varied by country but was consistently high (figure 1; appendix p 4). Countries expressing more worry and a greater impact on functioning tended to be poorer, in the Global South, and more directly impacted by climate change; in the Global North, Portugal (which had dramatic increases in wildfires since 2017) showed the highest level of worry.

Many respondents reported negative emotions; feeling afraid, sad, anxious, angry, powerless, helpless, and guilty were each reported by more than 50% of respondents (table 1; appendix p 5). The emotions least often reported were optimism and indifference. Respondents also reported a range of negative beliefs,

	All countries	UK	Australia	USA	India	Philippines	Nigeria	France	Finland	Portugal	Brazil
Sad											
Yes	6669 (66·7%)	631	641	569	735	909	615	638	536	705	690
No	3152 (31·5%)	345	332	414	256	87	362	338	442	273	303
Prefer not to say	176 (1·8%)	24	27	17	8	3	22	24	22	22	7
Helpless											
Yes	5095 (50·9%)	546	595	462	634	636	438	511	541	327	405
No	4720 (47·2)	437	381	519	351	356	549	449	444	647	587
Prefer not to say	186 (1·9%)	18	24	19	15	8	13	39	15	26	9
Anxious											
Yes	6181 (61·8%)	599	650	578	640	830	660	501	493	605	625
No	3641 (36·4%)	380	324	405	339	165	331	467	486	372	372
Prefer not to say	180 (1·8%)	21	26	16	21	6	10	32	21	23	4
Afraid											
Yes	6734 (67·3%)	615	644	542	743	897	658	667	536	707	725
No	3111 (31·1%)	364	325	441	246	98	334	309	445	279	270
Prefer not to say	156 (1·6%)	20	31	17	11	5	9	24	19	15	5
Optimistic											
Yes	3089 (30·9%)	253	274	242	456	460	473	227	263	223	218
No	6663 (66·6%)	717	696	731	522	524	512	739	683	763	776
Prefer not to say	250 (2·5%)	30	31	28	23	16	15	34	54	13	6
Angry											
Yes	5685 (56·8%)	553	574	482	623	702	433	604	485	589	640
No	4125 (41·3%)	420	397	494	362	283	558	363	493	400	355
Prefer not to say	192 (1·9%)	26	29	23	16	15	10	34	22	12	5
Guilty											
Yes	5020 (50·2%)	528	506	417	572	744	282	511	434	538	488
No	4793 (47·9%)	447	471	563	408	250	710	461	543	436	504
Prefer not to say	187 (1·9%)	25	23	20	20	6	8	28	23	26	8
Ashamed											
Yes	4562 (45·6%)	514	531	442	495	682	206	480	383	393	436
No	5249 (52·5%)	467	445	534	485	313	772	495	589	592	557
Prefer not to say	191 (1·9%)	18	25	24	20	6	22	26	28	15	7
Hurt											
Yes	4283 (42·8%)	414	445	383	611	781	448	311	250	336	304
No	5496 (55%)	561	524	597	378	212	538	649	717	633	687
Prefer not to say	219 (2·2%)	24	30	20	11	7	14	40	33	31	9
Depressed											
Yes	3864 (38·6%)	365	402	343	532	525	340	224	329	387	417
No	5940 (59·4%)	610	566	635	456	458	648	746	649	598	574
Prefer not to say	198 (2·0%)	25	32	22	13	17	12	31	22	15	9
Despair											
Yes	4418 (44·2%)	410	421	332	520	581	392	492	494	368	408
No	5348 (53·5%)	556	540	636	450	405	598	478	490	611	584
Prefer not to say	233 (2·3%)	33	38	32	30	14	10	30	17	21	8
Grief											
Yes	4151 (41·5%)	353	400	352	549	624	320	452	578	231	292
No	5632 (56·3%)	622	569	621	428	362	667	526	403	739	695
Prefer not to say	216 (2·2%)	25	30	27	23	14	13	22	19	30	13

(Table 1 continues on next page)

	All countries	UK	Australia	USA	India	Philippines	Nigeria	France	Finland	Portugal	Brazil
(Continued from previous page)											
Powerless											
Yes	5598 (56%)	554	606	482	589	643	426	683	471	577	567
No	4210 (42·1%)	425	371	498	398	350	557	292	505	390	424
Prefer not to say	192 (1·9%)	21	24	20	13	7	16	25	24	33	9
Indifferent											
Yes	2902 (29%)	259	295	261	463	481	305	181	300	150	207
No	6827 (68·3%)	704	654	711	515	502	678	785	664	834	780
Prefer not to say	272 (2·7%)	37	52	29	22	17	17	34	36	16	12

Data are number (%) of respondents in the whole sample (n=10 000) or number within each country (n=1000 in each country). Participants were asked "Does climate change make you feel any of the following?"

Table 1: **Emotions about climate change**

	All countries	UK	Australia	USA	India	Philippines	Nigeria	France	Finland	Portugal	Brazil
I am hesitant to have children											
Yes	3908 (39·1%)	378	432	356	407	473	232	367	422	365	476
No	5700 (57·0%)	579	535	599	531	506	751	578	536	586	499
Prefer not to say	390 (3·9%)	43	33	46	62	21	17	54	42	48	24
Humanity is doomed											
Yes	5566 (55·7%)	510	504	457	740	733	422	480	431	616	673
No	4065 (40·7%)	448	442	492	234	251	557	449	530	357	305
Prefer not to say	366 (3·7%)	41	54	50	26	16	21	71	39	26	22
The future is frightening											
Yes	7549 (75·5%)	725	763	679	804	915	702	738	562	806	855
No	2219 (22·2%)	248	206	283	179	76	289	226	404	170	138
Prefer not to say	231 (2·3%)	27	31	38	16	9	10	36	34	24	6
I won't have access to the same opportunities that my parents had											
Yes	5487 (54·9%)	531	572	439	671	705	493	610	425	537	504
No	4210 (42·1%)	438	396	516	307	282	501	331	539	416	484
Prefer not to say	305 (3·0%)	31	32	45	22	13	6	60	37	47	12
My family's security will be threatened (eg, economic, social, or physical security)											
Yes	5167 (51·7%)	393	483	348	652	769	553	496	296	524	653
No	4516 (45·2%)	566	469	616	321	215	431	440	675	443	340
Prefer not to say	317 (3·2%)	41	48	36	27	16	16	64	29	33	7
The things I most value will be destroyed											
Yes	5483 (54·8%)	470	523	423	692	736	535	450	425	587	642
No	4162 (41·6%)	487	429	539	285	251	457	475	526	370	343
Prefer not to say	357 (3·6%)	43	48	38	24	14	8	76	48	43	15
People have failed to take care of the planet											
Yes	8256 (82·6%)	795	807	780	860	927	757	768	750	889	923
No	1533 (15·3%)	175	165	191	124	64	241	195	220	89	69
Prefer not to say	210 (2·1%)	29	28	29	16	9	2	37	29	22	9
When I try to talk about climate change other people have ignored or dismissed me											
Yes	3928 (39·3%)	355	392	304	597	465	476	238	294	342	465
No	4189 (41·9%)	384	346	393	316	455	379	533	524	475	384
I don't talk to other people about climate change	1884 (18·8%)	262	262	303	87	80	146	229	182	183	150

Data are number (%) of respondents in the whole sample (n=10 000) or number within each country (n=1000 in each country). Participants were asked "Does climate change make you think any of the following?"

Table 2: **Negative beliefs about climate change and dismissal**

	All countries	UK	Australia	USA	India	Philippines	Nigeria	France	Finland	Portugal	Brazil
Taking my concerns seriously enough											
Yes	3003 (30·0%)	265	291	214	426	418	302	273	341	264	209
No	6382 (63·8%)	653	627	699	530	559	672	633	562	677	770
Prefer not to say	617 (6·2%)	82	82	87	45	23	26	94	97	59	22
Doing enough to avoid a climate catastrophe											
Yes	3076 (30·8%)	262	308	242	437	422	363	260	300	283	199
No	6442 (64·4%)	686	625	678	523	559	609	667	644	670	781
Prefer not to say	483 (4·8%)	53	67	80	40	19	28	73	56	47	20
Dismissing people's distress											
Yes	6010 (60·1%)	580	637	586	586	534	580	574	481	648	804
No	3399 (34·0%)	348	291	341	362	427	381	333	447	293	176
Prefer not to say	591 (5·9%)	72	72	73	52	39	40	93	71	59	20
Acting in line with climate science											
Yes	3645 (36·5%)	321	334	278	527	524	398	281	382	379	221
No	5719 (57·2%)	607	589	631	424	448	570	614	523	562	751
Prefer not to say	636 (6·4%)	72	77	90	49	28	33	104	95	60	28
Protecting me, the planet, and/or future generations											
Yes	3306 (33·1%)	314	315	250	490	467	351	273	338	330	178
No	6105 (61·0%)	624	614	674	471	502	617	618	575	616	794
Prefer not to say	591 (5·9%)	63	71	76	40	31	32	109	87	54	28
Can be trusted											
Yes	3126 (31·3%)	278	296	213	505	404	311	234	345	323	217
No	6157 (61·6%)	645	621	676	446	550	642	660	558	607	752
Prefer not to say	718 (7·2%)	77	83	111	49	46	47	106	97	71	31
Lying about the effectiveness of the actions they are taking											
Yes	6437 (64·4%)	613	657	620	674	686	659	582	543	623	780
No	2894 (28·9%)	315	267	291	288	285	284	295	367	305	197
Prefer not to say	669 (6·7%)	72	76	89	38	29	57	123	90	72	23
Failing young people across the world											
Yes	6489 (64·9%)	648	674	630	714	679	644	549	467	694	790
No	2977 (29·8%)	293	265	293	243	298	306	357	468	266	188
Prefer not to say	534 (5·3%)	59	61	77	43	23	51	94	64	40	22
Betraying me and/or future generations											
Yes	5847 (58·5%)	572	595	563	663	563	551	487	462	621	770
No	3467 (34·7%)	347	324	353	288	392	403	388	459	316	197
Prefer not to say	686 (6·9%)	81	81	84	49	45	46	125	79	62	34

Data are number (%) of respondents in the whole sample (n=10 000) or number within each country (n=1000 in each country). Participants were asked "In relation to climate change I believe that my government is/other governments are…".

Table 3: **Government-related beliefs**

with 75% saying the future was frightening (table 2; appendix p 6). Among those who said they talked with others about climate change (81% of the sample), almost half (48%) reported that other people had ignored or dismissed them (table 2). Results for thoughts and feelings about climate change varied considerably by country but negative feelings were strikingly present in all populations.

Pertaining to our second research question, which was how children and young people around the world perceive governmental responses to climate change, participants tended to rate government response negatively (mean score 14·96 on the 9–18 scale [SD 2·57]). More than half of respondents agreed with the negative statements (59–64%) and considerably less than half agreed with the positive statements (30–37%; table 3; appendix p 7). Across all countries, participants reported greater feelings of betrayal (mean score 2·7 [SD 1·0]) than of reassurance (2·22 [SD 0·93]; p<0·0001) and pairwise *t* tests showed that betrayal ratings were significantly higher than reassurance ratings within each country (p<0·0001; figure 2; mean scores by country are shown on appendix p 8).

To better understand patterns underlying responses to climate change, Pearson's correlation coefficients were calculated to explore correlations among variables

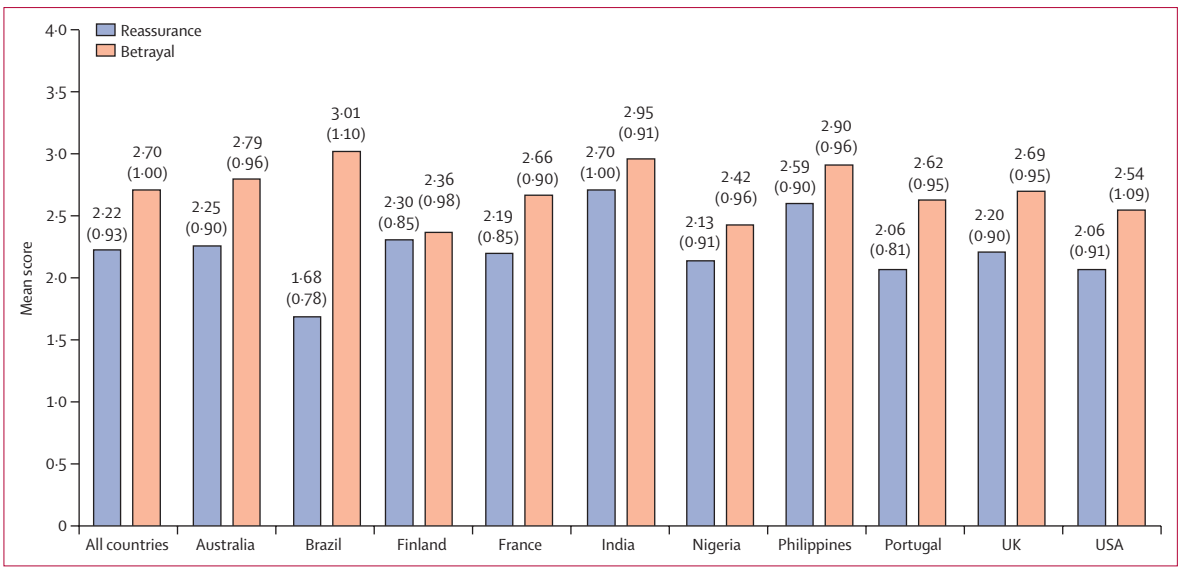

Figure 2: **Feelings of reassurance and betrayal relating to government response to climate change**
Data are shown for the whole sample (n=10 000) and by country (n=1000 per country). The values on the graph are mean (SD).

	1	2	3	4	5	6
1: Worried about climate change	..	..	..	..	..	..
2: Negative thoughts about climate change	0·48	..	..	..	..	..
3: Negative beliefs about government response	0·21	0·26	..	..	..	..
4: Feeling betrayed by government	0·43	0·47	0·36	..	..	..
5: Feeling reassured by government	0·01 (NS)	−0·04	−0·59	−0·02 (NS)	..	..
6: Negative functional impact	0·22	0·32	−0·1	0·25	0·21	..

Correlation coefficients (*r*) are shown. All correlations reported are significant at the p<0·0001 level unless otherwise indicated by NS. NS=not significant.

Table 4: **Correlation matrix for the study variables**

(table 4). Of note, negative thoughts, worry about climate change, and impact on functioning were all positively correlated and showed correlations with feelings of betrayal and negative beliefs about government response. Feelings of reassurance were not significantly correlated with worry and showed a very low but significant correlation with negative thoughts; the reassurance scale possibly confounded people who were not worried about climate change and people who were worried but considered the governmental response adequate. The relationship between negative thoughts and betrayal could be explained by the fact that they were both associated with worry about climate change. For this reason, a partial correlation was calculated while holding the level of worry constant. The correlation remained significant (r=0·32, p<0·0001), suggesting that even among people feeling the same level of worry about climate change, those who reported feeling betrayed by the governmental response reported an increased number of negative thoughts. Similarly, negative thoughts remained significantly correlated with a perception of government failure while holding worry constant (r=0·19, p<0·0001).

Discussion

According to our study, children and young people in countries around the world report climate anxiety and other distressing emotions and thoughts about climate change that impact their daily lives. This distress was associated with beliefs about inadequate governmental response and feelings of betrayal. A large proportion of children and young people around the world report emotional distress and a wide range of painful, complex emotions (sad, afraid, angry, powerless, helpless, guilty, ashamed, despair, hurt, grief, and depressed). Similarly, large numbers report experiencing some functional impact and have pessimistic beliefs about the future (people have failed to care for the planet; the future is frightening; humanity is doomed; they won't have access to the same opportunities their parents had; things they value will be destroyed; security is threatened; and they are hesitant to have children). These results reinforce findings of earlier empirical research and expand on previous findings by showing the extensive, global nature of this distress, as well as its impact on functioning. Climate distress is clearly evident both in countries that are already experiencing extensive physical impacts of climate change, such as the Philippines, a nation that is highly vulnerable to coastal flooding and typhoons. It is

also evident in countries where the direct impacts are still less severe, such as the UK, where populations are relatively protected from extreme weather events. Distress appears to be greater when young people believe that government response is inadequate, which leads us to argue that the failure of governments to adequately reduce, prevent, or mitigate climate change is contributing to psychological distress, moral injury, and injustice.

Such high levels of distress, functional impact, and feelings of betrayal will negatively affect the mental health of children and young people. Climate anxiety might not constitute a mental illness, but the realities of climate change alongside governmental failures to act are chronic, long-term, and potentially inescapable stressors. These factors are likely to increase the risk of developing mental health problems, particularly in more vulnerable individuals such as children and young people, who often face multiple life stressors without having the power to reduce, prevent, or avoid such stressors.[2,18,22,23] As severe weather events linked with climate change persist, intensify, and accelerate, it follows that, in the absence of mitigating factors, mental health impacts will follow the same pattern. We are already seeing increased severe climatic events that act as the precipitating and perpetuating factors of psychological distress; as of September, 2021, numerous unprecedented weather events have occurred since our data collection (including the heat dome and wildfires in the Pacific Northwest, catastrophic storms and floods in Germany, Iran, China, London, and New York, and heat records repeatedly broken in Northern Ireland and North America).

Factors known to protect against mental health problems include psychosocial resources, coping skills, and agency to address and mitigate stressors. In the context of climate anxiety, this protection would come in the form of having one's feelings and views heard, validated, respected, and acted upon, particularly by those in positions of power and upon whom we are dependent, accompanied by collective pro-environmental actions. However, this survey shows that large numbers of young people globally regard governments as failing to acknowledge or act on the crisis in a coherent, urgent way, or respond to their alarm. This is experienced as betrayal and abandonment, not just of the individual but of young people and future generations generally. The results here reflect and expand upon the findings of an earlier interview study, in which young people described their feelings about climate change as being "stranded by the generational gap" and feeling "frustrated by unequal power, betrayed and angry, disillusioned with authority, drawing battle lines".[25]

Defence mechanisms against the anxiety provoked by climate change have been well documented, including dismissing, ignoring, disavowing, rationalising, and negating the experiences of others.[27] These behaviours, when exhibited by adults and governments, could be seen as leading to a culture of uncare.[27] Thus, climate anxiety in children and young people should not be seen as simply caused by ecological disaster, it is also correlated with more powerful others (in this case, governments) failing to act on the threats being faced. Our findings are in line with this argument and, alongside pre-existing evidence, lend weight to the proposal that climate distress in children and young people can be regarded as unjust and involving moral injury.[28] Young people's awareness of climate change and the inaction of governments are seen here to be associated with negative psychological sequelae. Moral injury has been described as "a sign of mental health, not disorder… a sign that one's conscience is alive",[27] yet it inflicts considerable hurt and wounding because governments are transgressing fundamental moral beliefs about care, compassion, planetary health, and ecological belonging. This sense of the personal, collective, and ecological perspective is summarised in the words of one 16-year-old: "I think it's different for young people. For us the destruction of the planet is personal".[13]

By endangering and harming fundamental human needs, the climate crisis is also a human rights issue. Legal bodies recognise an intersection between human rights, climate change, and climate anxiety. Subjecting young people to climate anxiety and moral injury can be regarded as cruel, inhuman, degrading, or even torturous.[31,32] This provides further understanding for the current phenomenon of climate criminology,[33] in which children and young people are voicing their concerns through legal cases as an attempt to have their distress legitimised and validated legally in the face of government inaction.

A complete understanding of climate anxiety in children and young people must encompass these relational, psychosocial, cultural, ethical, legal, and political factors. Current narratives risk individualising the so-called problem of climate anxiety, with suggestions that the best response is for the individual to take action.[3] Our results suggest that such action needs to particularly be taken by those in power. To protect the mental health and wellbeing of young people, those in power can act to reduce stress and distress by recognising, understanding, and validating the fears and pain of young people, acknowledging their rights, and placing them at the centre of policy making.[23] Before we can offer younger generations a message of hope, we must first acknowledge the obstacles that must be overcome.[12]

Limitations of this study include the use of non-standardised measures to investigate the experience of climate anxiety and how people think and feel about government responses, which are complex and nuanced subjects. Unfortunately, no appropriate standardised measures existed for our purposes. The construct of climate anxiety itself is new and complex, with varying definitions across the literature. Although our results show that many young people report difficult thoughts, emotions, and functional impairment related to climate change, we cannot indicate how severe this is in

comparison to normative samples. We aimed to investigate whether certain emotions and thoughts were present across different countries in the world, rather than to assess the degree to which these thoughts and feelings are felt. Therefore, we chose to use a three-factor response scale (yes, no, or prefer not to say) to encourage a high response rate and to facilitate valid responses from those less familiar with Likert scales. Although dichotomous response scales can exaggerate acquiescence, having a third, neutral option can mitigate this. This is supported by our finding that statements on negative emotions and beliefs were more commonly endorsed than positive or neutral statements.

Without measures of mental health, these results cannot assess how or whether climate anxiety is affecting mental health outcomes in these populations. The study did not measure the severity of climate anxiety by any psychological scale, although it should be noted that some results related to youth cognitions indicate strong emotions, such as the belief that "humanity is doomed". Of note, the data were based on equal sample sizes per country and were not weighted according to population size, so aggregated results must be interpreted with caution because they are not globally representative. However, more populous countries (eg, India with more than 1·3 billion people) reported greater levels of worry, functional impairment, negative beliefs, and so on, indicating that our aggregated findings are probably a conservative estimate of distress levels globally. Other limitations arose from the use of an online polling company, for which completion required internet access, and sometimes the ability to speak English. Thus, although the samples should not be biased towards those who are especially concerned about climate change, they are not fully representative of the countries' populations. Finally, the polling company provided data on gender defined only as male or female, which fails to recognise the non-binary nature of gender.

This study's strengths include its large sample size and global reach, and it is a novel and timely investigation into climate anxiety and perceived government response. It offers good representation within countries by using a polling company with proven inclusive participant selection and minimisation of respondent bias by not advertising the nature of the study (eg, climate-related) in advance. We present the results as an initial attempt to quantify the global scale of the psychological impact of climate change and of inadequate government responses upon young people.

To conclude, our findings suggest that climate change, climate anxiety, and inadequate government response are all chronic stressors that could threaten the mental health and wellbeing of children and young people around the world. This survey offers a preliminary overview; further, detailed research is required to explore the complexities and wide variety of climate feelings. Climate anxiety is a collective experience,[27] and based on our results, children and young people would benefit from having a social discourse in which their thoughts and feelings are respected and validated, and their concerns are acted upon by people in positions of power. Climate anxiety indicates the care and empathy that young people have for our world. As one young person said: "I don't want to die. But I don't want to live in a world that doesn't care about children and animals."[13]

As a research team, we were disturbed by the scale of emotional and psychological effects of climate change upon the children of the world, and the number who reported feeling hopeless and frightened about the future of humanity. We wish that these results had not been quite so devastating. The global scale of this study is sufficient to warrant a warning to governments and adults around the world, and it underscores an urgent need for greater responsiveness to children and young people's concerns, more in-depth research, and immediate action on climate change.

Contributors

All authors contributed to the study design and conceptualisation. Literature searches were done by CH, PP, and SC. The underlying data were verified and analysed by SC, REL, EM, and EEM. The manuscript was drafted by CH, PP, EM, REL, SC, EEM, CM, and BW. All authors revised and commented on the manuscript and approved the final version. All authors had full access to the data and accept responsibility for publication.

Declaration of interests

We declare no competing interests.

Data sharing

Individual, unidentified participant data that underlie these results will be made available, beginning 3 months and ending 5 years after publication, to researchers who provide a methodologically sound proposal, to achieve aims in said approved proposal. Proposals will be considered by a small team of the authors and requests should be directed to c.l.hickman@bath.ac.uk, e.marks@bath.ac.uk, or panu.pihkala@helsinki.fi. To gain access, data requestors must sign a data access agreement.

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