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Social media engagement in people and climate change

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'People' are central both to populism, an ideology in which 'people' are pitted against corrupt elites, and to climate science and policy, which advocate 'people-centred' climate action. Our Brief Communication explores references to climate change and 'people' on Twitter (now X). Populist tropes (the people against corrupt elites) were not restricted to climate-sceptical tweets; they extended to tweets that recognised climate change was real but expressed mistrust about climate actions.

'People' are central to two divergent perspectives on climate change and policies and interventions to address it (hereafter referred to as climate action). Scientific and policy reports highlight the human causes and impacts of climate change[1] and argue for 'people-centred' approaches to emissions reductions, particularly in high-income countries contributing most to climate change[2,3]. The involvement of people is viewed as essential to 'catalyse and sustain' rapid decarbonisation[4,5].

People are also central to populism, a 'thin' ideology in which 'the people' are pitted against corrupt elites intent on controlling and exploiting them[6]. Elites are those with political and economic power (e.g., government, the commercial sector, the rich) and expertise (e.g., scientists) who are seen to be advancing their interests against those of the people. In consequence, neither their knowledge claims nor their actions can be trusted. Climate change has emerged as a key site for populist ideologies, with the tropes of the people vs. the elite deployed to question the reality of climate change[7]. Studies suggest that these tropes are also used to oppose climate action, with policies like net zero seen as a betrayal of the public by self-serving elites[8].

With 'people' central to two very different depictions of climate change and climate action, this Brief Communication explores references to 'people' in social media coverage of climate change. We focus on Twitter (now X); at the time of our study, it was an increasingly used online forum for information and opinion-sharing, particularly on climate change[9]. Of those aged ≥ 13 years, over 30% of residents in the US (95m) and Canada (10m) were Twitter users; in the UK, the proportion was over 40% (23m)[10].

Our Brief Communication asks two questions: what proportion of climate change-related messages refer to 'people' and how are people represented in these posts? We searched English language posts on Twitter from 21 March to 11 May 2023 using climate change textwords and hashtags. We then searched these climate change tweets for references to the term 'people'. We also undertook a content analysis of a random sample of climate change tweets referring to people to explore how people were represented in these posts.

During the study period, there were 668,810 tweets with one or more climate change textwords (Supplementary Note 1). Tweeters' location was available for a minority (24%; 163,303); the largest groups were from the US (42%; 68,097), the UK (22%; 36,564) and Canada (9%; 15,012) (Supplementary Note 2).

After excluding stopwords and climate change search terms, 'people' was the most frequently used term in the climate change tweets; 6.9% (46,417) of the climate change tweets referred to people (Supplementary Table S1). Within this sub-group of tweets, 11% (3289) referred to net zero.

In the random sample of climate change tweets referring to people, the majority (77%) focused on climate change and/or climate action and actors (government, political leaders, fossil fuel companies, the rich). The remaining tweets were a heterogenous set (Supplementary Note 3) and were excluded from the analysis.

The content analysis generated a two-dimensional schema. Tweets differed in their topic: (i) climate change alone or (ii) climate action and actors, with or without reference to climate change. Tweets also differed in their views, either accepting anthropogenic climate change and action to address it or expressing scepticism about climate change, climate action and/or actors.

Tweets referring to people could, therefore, be placed in one of four broad groups: climate change is accepted (35%) or doubted (42%); climate action and/or actors are trusted and supported (3%) or mistrusted and opposed (20%). Examples are presented in Table 1 (further examples in Supplementary Note 3). The dominant attitude was scepticism, particularly in tweets focused on climate actions and actors.

Populist framings were not restricted to tweets expressing scepticism about climate change (B in Table 1). They were also evident in posts sceptical of climate action (D in Table 1) and were not confined to tweets that might be considered broadly dismissive of climate change. Populist sentiment, with its positioning of people against elites and its mistrust of institutions, was also evident in tweets that accepted climate change was real ('are the elites bullshitting everyone to make money? Yes. Is global warming a

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Table 1 | Examples of tweets

A. *Climate change is accepted*
We the *people* are causing climate change
People caused climate change, and *people* can solve it.
Are *people* finally waking up to the reality that nothing else matters if we don't take steps to slow climate change
Alberta literally burning while half the *people* think climate change is woke nonsense
The latest climate science assessment warns—once again—that global warming of more than 1.5 degrees Celsius would be devastating for Earth's *people* and ecosystems.
B. *Climate change is doubted*
Today 'climate change' is being used to push totalitarian measures on the *people* to further abuse & exploit us.
Man-made climate change is a hoax invented by the globalists to control *people* and not to control the climate.
Climate Change is an amorphous pseudoscience exploited to alarm *people*. It's modern superstition supported by hired experts.
It's nothing but a scam to make some *people* rich at the expense of others. Not one of these clowns can define what climate change is
This climate change thing all is the same power argument. "*people* are too free so let's come up with a problem and scare *people* so that we consolidate all power and redistribute it as we see fit "
C. *Climate action and/or actors are trusted and supported*
I am a humanist who believes all *people* have rights. I agree with Biden on climate change and on his economic plan for the country, I'm fully aligned with him as an independent voter.
By voting for *people* who'll challenge these powerful industries and support climate policies like the #GreenNewDeal, this is how we can secure a livable future. One that calls on us to fight for and protect.
Net zero is the will of the UK *people* This government was elected on a manifesto with net zero as a key commitment
In the midst of facing climate change, we can still take action. By voting for *people* who'll support climate policies like the #GreenNewDeal, this is how we can secure a livable future.
D. Climate action and/or actors are mistrusted and opposed
Nuance is lost on most *people*. Are the elites bullshitting everyone to make money? Yes. Is global warming a thing? Yes.
If you think oil and gas firms want to address climate change, you are crazy. They make trillions from oil. They've spent hundreds of millions trying to convince *people* it's a fake issue.
Global warming might be a real thing, but shame on the government for using it to create fear and control *people*
Net zero Proof that the only *people* the EU elites hate more than Russians are their own *people*
The west's obsession with net zero is self-inflicted destruction. We, the *people*, are suffering greatly. It feels as if governments have declared war on their own citizens.

thing? Yes'). Scepticism was the dominant attitude running through the tweets: over 60% of the tweets in our sample expressed doubt about climate change and/or climate action.

Our Brief Communication contributes to a rich seam of research on social media engagement with climate change[7,11], including studies investigating the absence or presence of people in visual representations of climate change[12–14]. We add to this research by focusing on references to 'people' on a popular microblogging platform.

Some study limitations should be noted. Firstly, the study was exploratory. A larger study would have supported a wider range of methods (for example, combining qualitative analysis with natural language processing). A larger study could also enable evidence from population-based studies, for example of the perceptions of adults, to be compared with evidence from Twitter posts.

Secondly, the study relied on a single platform. Different platforms provide different modes of engagement (e.g., via visual content) and have different user bases. Compared to the national population, US and UK Twitter users are more likely to be male, urban and have higher incomes[15,16]. Elon Musk's purchase of Twitter in October 2022 saw an increase in accounts linked to right-wing communication networks[17]. Although we filtered out high-volume users, it is likely that our study included a higher proportion of climate-sceptical tweets (illustrated in categories B and D in Table 1) than one conducted prior to October 2022.

With these caveats, our study provides evidence that the concept of 'people' is incorporated into two divergent discourses on climate change and action. One conveys the human impacts of climate change ('global warming … would be devastating for Earth's people') and the action needed to address it ('by voting for people who'll… support climate policies'). The other regards climate change as 'an amorphous pseudoscience exploited to alarm people' used by powerful elites to 'push totalitarian measures on the people'. The deployment of populist tropes was not restricted to tweets expressing climate change scepticism; it extended to tweets that, while recognising climate change was real, expressed mistrust about climate actions.

In line with Atkins' analysis of UK populism[8], we found that scepticism and anti-elite sentiments extended to the realm of climate policy and governance. While social media platforms like Twitter amplify sceptical voices, scepticism has been linked to a broader breakdown of public trust[18]. Rebuilding trust in social institutions (government, science, the wider economic system) is integral to developing a people-centred approach to climate change that is not grounded in the populist binary of 'the people versus the elite'.

Addressing the factors driving public scepticism is not a task that climate scientists and policy actors can achieve alone, for example, through public dialogue and participatory community-based initiatives. It requires political leadership, backed by policies that address underlying causes, including widening inequalities in income and life chances and the social polarisation that this produces[19,20].

Methods

Search strategy

Using Mozdeh software[21,22] and climate change textwords and hashtags ('climate change', 'climatechange', 'global warming', 'globalwarming'; #climatechange, #globalwarming; 'net zero', 'netzero' and #netzero), we searched English language posts on Twitter (Supplementary Note 1). We avoided terms and hashtags that retrieved polarised views (e.g., #climatehoax, #climatescam, #endoftheworld, #climate catastrophe,

#climate crisis). We excluded those posting > 500 posts per week, to avoid skewing the analysis towards high-volume users (e.g., public figures, lobby groups) expressing strong views on climate change and climate action. Most users tweet a few times a day (or less)[23]. Where locational data were available, we recorded the country of those posting the tweets.

Content analysis

The database of climate-related tweets was then searched for references to the term 'people'. We recorded the overall proportion of posts referring to 'people'. We undertook a qualitative content analysis of a random sample of tweets (to ensure its representativeness) and followed qualitative guidelines with respect to sample size and methods of analysis[24,25]. The coding unit was the tweet; the coding schema was developed inductively through a two-staged process: by coding firstly by topic (e.g., climate change) and then by views expressed on the topic. The coding schema was developed using an initial set of 100 tweets; following reviewer checks, it was then used to code the full sample of 500 tweets (Supplementary Note 3).

Data availability

The data that support the findings are publicly available on Twitter. Copies of the tweets cannot be provided as this would breach Twitter Terms of Service and would prevent the anonymity of the people posting in our sample. Twitter IDs are available on request from the authors for those wishing to hydrate them; however, this cannot be applied to those without a paid subscription to Twitter or to those Tweets deleted or made private since the time of this study. All example Tweets provided in the manuscript are either paraphrased or were phrases used in multiple tweets, thus protecting the anonymity of the person tweeting.

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Author contributions

H.G. and S.G. conceived the study. S.G. compiled the dataset. H.G. and S.G. undertook the analysis. H.G. was the major contributor to writing and reviewing the manuscript. Both authors read and approved the final manuscript.

Competing interests

The authors declare no competing interests.

Ethics statement

The University of York Health Sciences Research Governance Committee was consulted and recommended (29 August 2023) that the study did not require ethical approval as the Twitter data used were already in the public domain and were to be used in aggregate with no identifiable data.

Additional information

Supplementary information The online version contains supplementary material available at https://doi.org/10.1038/s44168-024-00167-5.

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