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Review

From individual to collective climate emotions and actions: a review

Tobias Brosch*



This review summarizes the current state-of-the-art of our knowledge about group-based and collective emotions and their link to collective climate action. I first review the mechanisms underlying collective emotional phenomena, followed by a discussion of the role of emotions in psychological theories of collective action. Then, I survey the empirical literature on the link between emotions and collective climate action, including laboratory and online research as well as field studies with participants of real-world collective action. The evidence illustrates how group-based and collective emotions can override self-interested utility calculations and perceptions of individual powerlessness, help spread information about climate change, and increase group cohesion and identification, thus motivating collective climate action from policy support to participation in mass demonstrations and civil disobedience movements. Emotions also can reduce willingness to act, induce complacency, and emphasize and reinforce existing group divisions on the topic of climate change. To conclude, I discuss limitations and avenues for future research.

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<https://doi.org/10.1016/j.cobeha.2024.101466>2352–1546/© 2024 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).**Introduction**

The consequences of climate change are becoming more tangible around the globe [1], and more and more people feel strong emotions toward climate change [2]. Many

people, especially younger ones, report substantial levels of climate anxiety, with considerable negative consequences for their mental health and well-being [3]. At the same time, emotional reactions to climate change can be important drivers of climate action [4].

There has been a surge in research interest concerning the role of emotions in the human response to climate change, as illustrated by the amount of recent reviews [4–8] and special issues [9] published on the topic. While most research so far has focused on emotions as individual-level phenomenon, emotions experienced in the context of climate change are bound to have an important collective element: Climate change is a collective problem that is caused by the collective behavior of people around the globe, affects individuals and communities world-wide and over the span of generations, and requires large-scale collective action to be addressed [10]. Therefore, emotions related to climate change need to be considered from a collective perspective as well. This review summarizes the current state of our knowledge about group-based emotions, that is, emotions that are experienced on behalf of a social group, and collective emotions, that is, emotions that are experienced within a social group, in the context of the collective human response to climate change (see [Box 1](#) for a glossary of important terms).

From individual emotions to group-based and collective emotions

A central assumption shared by most theories of emotion is that emotions occur when an individual appraises a situation as directly affecting them in some way (see [Figure 1a](#)) [11]. Anger, for instance, is based on the appraisal that 'a demeaning offence against me' [12] is occurring, an event that I perceive as an unfair transgression for which someone else is accountable who could have acted differently. The motivational tendency that is part of this emotion is to move against the offending actor to repair the injustice [13]. Guilt is based on the appraisal of 'me having unjustly harmed another or having violated a moral standard' and includes motivational tendencies supporting reparation and social reintegration [14]. Emotions thus detect and focus our attention on specific events and situations and mobilize resources that support a response [15].

Although much research in the affective sciences has focused on emotions as individual-level phenomena

Box 1 Glossary.

Emotions: Episodes of interrelated changes that occur when an individual appraises a situation, an event, or an object as being relevant to their concerns, resulting in changes in motivational action tendencies (e.g. approach, withdraw), physiological changes (e.g. changes in skin conductance or heart rate), changes in motor expression (in face, voice, and body), and changes in subjective feeling. Once an emotion is elicited, it can influence subsequent evaluations and judgments (e.g. by influencing subsequent risk appraisals), as well as social interactions, as emotional expressions (e.g. facial expressions of distress, a sad prosody in the voice) allow people to communicate their needs and intentions to others in a quick and efficient manner.

Group-based emotions: Emotions that are experienced by an individual on behalf of a social group. When an individual self-categorizes as a member of a specific social group, and the group membership becomes salient in a situation that is relevant for this group, the individual will appraise the situation in terms of its group relevance instead of its individual relevance. These group-based appraisals result in group-based emotions, which can vary in their strength depending on the strength of the group identification of the individual.

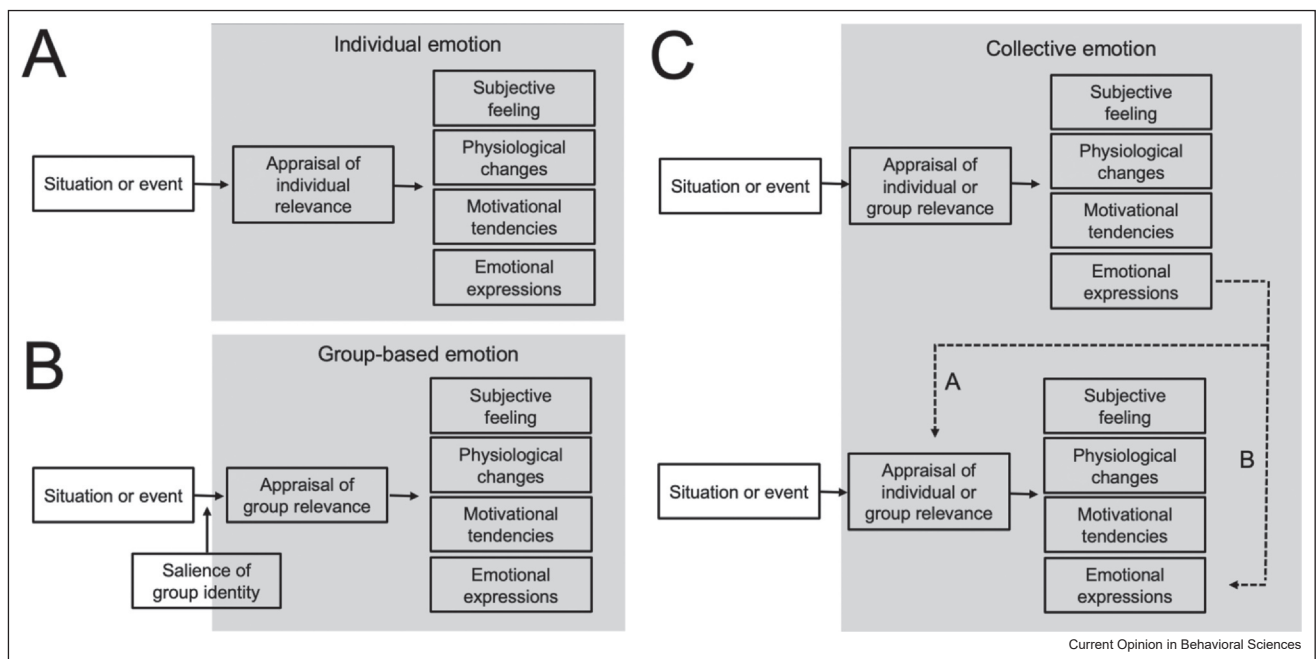
Collective emotions: Emotions that occur when several people experience and express emotions together. The individually experienced and expressed emotions then interact and influence each other, via emotional contagion or social appraisal mechanisms.

Emotional contagion: The tendency of individuals to automatically mimic the facial expressions, vocalizations, postures, and movements of another person, resulting in emotional synchronization and convergence, that is, their emotions becoming increasingly similar over time.

Social appraisal: A process in which an individual takes into account the emotions expressed by someone else to inform their own appraisal of what is happening in a given situation.

Collective action: Any action that individuals undertake as member of a psychological group that aims to improve their group's conditions, act in solidarity with another disadvantaged group, or protect values and moral principles. Instances of collective action can range from signing a petition to participating in social protests and demonstrations up to acts of civil disobedience, sabotage, or violence.

Figure 1



Individual, group-based, and collective emotions, mechanisms involved in the elicitation of individual, group-based, and collective emotions. **(a)** Individual emotions are elicited when an individual appraises a situation or an event being relevant to their concerns, resulting in an emotional response that includes changes at the level of subjective feelings, physiological changes, motivational changes, and emotional expressions. **(b)** Group-based emotions are elicited when an individual self-categorizes as a member of a specific social group, and the group membership becomes salient in a situation that is relevant for this group. The individual will appraise the situation in terms of its group relevance rather than its individual relevance, resulting in a group-based emotion. **(c)** Collective emotions occur when multiple people experience and express emotions together, which then influence each other. This influence can occur via social appraisal, that is, an individual takes into account the emotion expressed by someone else to inform their own appraisal of what is happening in a given situation (dashed arrow A), or via emotional contagion, that is, the automatic mimicking of others' emotional expressions (dashed arrow B). In the figure, these paths are only displayed from one individual to the other, but in reality operate reciprocally.

[11], social scientists have long been interested in collective emotions and their impact on collective behavior. In his *psychology of crowds* [16], Gustave Le Bon suggested that emotions can spread by contagion in individuals who are immersed in large anonymous groups. Supporting this idea, a lot of evidence has been found for emotional contagion, the tendency to automatically mimic facial expressions, vocalizations, postures, and movements of other people, resulting in emotional synchronization and convergence [17]. Emile Durkheim, in his *elementary forms of religious life* [18], coined the term ‘collective effervescence’ to describe the synchronization and intensification of emotions that occur during social rituals. He hypothesized that it increases group cohesion and highlights shared ideas and collective concerns. Many experiments and field studies have since confirmed that collective gatherings result in shared emotions, which strengthen group identification, social values, and collective efficacy beliefs [19].

When reviewing the literature on collective emotional phenomena, it is important to distinguish between *group-based emotions* and *collective emotions*. Group-based emotions are emotions that an individual experiences on behalf of a social group to which they belong and with which they identify (see Figure 1b) [20]. If an individual’s group membership is salient in a situation, the individual will appraise the situation in terms of its relevance for the group instead of its relevance for the individual alone. These group-based appraisals result in group-based emotions, which can vary in strength depending on the level of group identification of the individual [21]. Collective emotions occur when multiple people experience and express emotions together (see Figure 1c) [22,23]. Individually experienced emotions interact with and influence each other. This influence can occur via emotional contagion, that is, the automatic mimicking of others’ emotional expressions, and via social appraisal, that is, when an individual takes into account the emotion expressed by someone else to inform their own appraisal of what is happening in a given situation [24]. Individuals experience group-based emotions on behalf of a group, but group-based emotions can in principle occur in isolation. For collective emotions to occur, the presence and mutual awareness of multiple individuals are required, be it in direct physical proximity or using more distal communication channels such as social media [25].

The role of emotions in theories of collective action

Collective action represents a social dilemma because an individual incurs cost and effort when participating in collective action, while potential benefits occur at the collective level. Individual costs usually outweigh individual benefits, making participation in collective action unlikely from a strict rational-actor perspective [26].

This is where emotions come in: group-based emotions allow the individual to transcend individual utility calculations by highlighting the relevance of group-based concerns over individual concerns [27]. Group-based emotions moreover involve appraisals of collective efficacy instead of individual efficacy, which allows to counter feelings of individual powerlessness, a major psychological barrier to action against large-scale problems, such as climate change [28]. Group-based emotions may thus help to overcome individual psychological barriers that prevent an initial engagement in collective action. Once the individual has engaged in collective action, collective emotions may contribute to sustained participation by increasing group cohesion and providing motivational rewards for collective action [29].

Most psychological theories of collective action now recognize the important role of emotions [30–33]. The Social Identity Model of Collective Action, for instance, assumes that people take collective action toward a perceived injustice when they identify with a social group, experience strong negative affective reactions toward this injustice, and believe that their group’s collective action can be effective [32]. The model has in later iterations been extended to include participative efficacy beliefs, referring to the belief that one’s own actions will be an important contribution to collective group efforts [34], and to give a more central role to the moral convictions that an individual holds about the issues at stake [30]. Many studies have confirmed that group-based anger systematically predicts intentions to engage in collective action as well as actual collective action, with a recent meta-analysis based on 207 effect sizes reporting an average correlation of $r = 0.39$ between group-based emotional perceptions of injustice and collective action [30].

Group-based emotions and climate action

Most research and theorizing about the role of emotions in collective action has focused on group-based anger, an emotion that aims to resolve a perceived injustice and that is directed toward an offending actor. While many instances of collective action are indeed shown in confrontations between a disadvantaged group and other groups, the case of climate change is somewhat different, as climate change has been caused by the collective behavior of humanity over the last decades. It is thus often not straightforward to unequivocally identify an offending actor, as most individuals can be construed as being both a perpetrator who contributes to climate change and a victim who is confronted with substantially degrading living conditions. Thus, anger may not be the only or the most important emotion to consider in the context of collective climate action, opening up the scope to other emotional pathways to collective action [31]. It is of course still possible that perceptions of

inaction, obstruction, or unfairness elicit anger and drive collective climate action. For instance, strong identification with a marginalized group disproportionately affected by environmental pollution was found to increase perceived group-based anger toward environmental injustice, which mediated the link between group identification and behavioral intentions to engage in collective climate action [35].

Going beyond anger, several other emotions have been empirically related to climate action. Fear is an emotional response to threatening situation where no immediate external agent can be identified and serves to coordinate reactions that help to deal with the danger. This can include attempts to remove oneself from the dangerous situation (withdrawal), but also, especially in the case of collective threats, to communicate about the threat and to seek assistance [36]. Consistent with this, studies inducing fear by emphasizing the negative collective consequences of the climate crisis increased willingness to share news about the climate crisis on social media [37] and increased general intentions to engage in collective climate action [33].

As our collective behavior contributes to climate change, self-critical emotions such as guilt or shame also should be considered. Several experimental studies have induced group-based guilt about collective contributions to climate change. For instance, American participants who received information about human-caused climate change experienced more guilt about their nation's greenhouse gas emissions and were more willing to conserve energy and pay green taxes [38]. Similarly, Americans confronted with the large US carbon footprint reported more group-based guilt, which partially mediated the effect of the carbon feedback on their willingness to be involved in a proenvironmental group [39]. A sample of German participants confronted with human-caused environmental damage reported increases in group-based guilt, shame, anger, and sadness and were more likely to sign an environmental petition. A combined variable of guilt and shame mediated the impact of the information on signing behavior. Interestingly, only guilt and shame, but not anger, predicted the behavior [40]. Similarly, a study that induced either anger or guilt with a fictional text about climate change in US participants found that guilt, but not anger, increased subsequent support for climate change policies [41]. Thus, anger may mainly motivate protest behavior that is related to challenging the social status quo. Guilt may play a bigger role in the case of support for local initiatives and for climate policies, which are more peaceful actions aiming at repairing damages [42]. This reasoning is supported by a study that found specific links between distinct emotions and specific motivational tendencies in the environmental context. The study presented German participants either with

scenarios that emphasized German responsibility for environmental damage, which increased participants' group-based guilt and anger, or with scenarios that emphasized German involvement in environmental protection, which increased feelings of group-based pride. The different emotions specifically mediated the links between the messages and different motivational tendencies: Guilt predicted intentions to repair the damage, anger predicted intentions to punish the wrongdoers, and pride predicted intentions to reward the group [43].

Notions of progress and efficacy with regard to climate action can result in feelings of hope, pride, or joy. Experimental studies focusing on the link between hope and collective climate action found mixed results. Messages describing that ambitious climate targets can be achieved, given strong political actors and sufficient policy support resulted in increased feelings of hope, but no increases in collective action intentions [44]. Messages outlining concrete approaches for efficient action by pointing out how easy it is for an individual to take political action, how likely it is that politicians will respond to public opinion, or how effective specific proposed climate policies will be increased climate-related political participation via increases in hope [45]. To understand these patterns, it is important to differentiate between subtypes of hope: 'Constructive hope', emphasizing the importance of solution-oriented individual and collective action, can have a mobilizing effect, while 'passive hope', emphasizing that there can be overall progress in climate change without active involvement, is inefficient or may even induce complacency [46]. Yet other research investigated the emotion of 'being moved', referring to a feeling of being deeply touched by the idea that collective action may result in important changes. Videos emphasizing collective efficacy increased feelings of being moved, which mediated the effect of collective efficacy appraisals on collective action intentions [47].

Collective emotions and climate action

While group-based emotions can be studied using well-established research methods, such as laboratory experiments and questionnaires, research on collective emotions is methodologically more challenging. To assess how the emotions of multiple individuals affect each other, their expressed emotions must be measured simultaneously. As a consequence, most research on collective emotions takes place in an online setting, for instance, by analyzing how social groups communicate on social media [48], how emotions spread in these settings, and how these emotions influence subsequent judgments and behaviors [49]. Research on instant messenger services has revealed that people share messages about political issues more often if the content is expressed in moral-emotional language [50]. Consistent with this, an analysis of social media messages posted by

environmental activists has shown that the more negative emotions their climate-related messages contained, the more frequently they were shared [51]. Exposure to these negative climate messages was moreover found to negatively impact the affective state of the reader, confirming that social media exchanges can actually elicit collective climate emotions [51]. Collective emotions, especially negative emotions, may thus help spread messages about climate change to a larger audience. However, this impact seems to be bounded by group membership, as emotional language was found to increase diffusion within ideological networks but to decrease diffusion between networks [50]. Thus, if left unchecked, negative collective emotions can contribute to dividing people on the issue of climate change by emphasizing and reinforcing existing group divisions.

Research on small-group dynamics in conversations about climate change points to pathways to counter these negative emotional influences. Motivated reasoning plays a big role in how people treat scientific information about climate change [52]. In general, people are motivated to process information in a way that is consistent with their beliefs and their identity. Both climate deniers and climate believers perceive themselves as belonging to distinct communities, with shared values and beliefs that are at odds with the other side [53]. Information that threatens these identities can lead to negative emotions, which reduce their openness to update their beliefs and to reach consensus with others [54]. An intervention study aiming to develop new approaches for climate change discussions aimed to foster a common group identity by having participants in an online chat setting engage in a conversation focusing on self-disclosure and value affirmation before discussing information about climate change [55]. The intervention resulted in a more positive overall emotional tone of the climate change discussion (as assessed by automated text analysis), which in turn increased the likelihood that the group would reach a consensus on climate change. An analysis of online comments reacting to posts by farmers who engage with the public on social media showed that the farmers' transparent discussions of the difficulties of contemporary farming practices were met with 'digital empathy' in the form of positive emotional reactions aiming to support a mutual understanding [56]. These studies indicate that an empathetic stance expressed by positive emotions is an important precondition for constructive climate-related discussions between different groups. Taken together, research on large-scale communication pattern as well as small-group dynamics illustrates that collective emotions can both divide and unite people on the issue of climate change. While collective emotions may indeed lead to increased group cohesion, this may not necessarily result in more constructive climate action in an ideologically polarized landscape where beliefs about climate change have become a central part of peoples' identity [53]. Strategies

informed by emotion research that aim to foster empathy, transmitted via reciprocal positive emotions, may help improve the quality of a societal dialog about the necessity to take sufficiently powerful measures to fight climate change.

In addition to their impact on group cohesion, it has been suggested that collective emotions may serve as a motivator for collective climate action [29]. Building upon the substantial body of work documenting the potential of social norms, that is, information about other people's actions, in driving climate action [57], two recent experimental studies have set out to test this hypothesis by communicating emotion norms [58], that is, information about other people's emotions. One of these studies showed that being exposed to a message stating that public anger about US inaction on climate change is growing resulted in increased perceptions of public support for climate mitigation policies, increased expectations that collective climate action will occur, and increased personal support for climate mitigation action [59]. A second study showed that messages indicating that most Americans feel anger about environmental issues increased experienced personal anger as well as support for policies addressing these environmental issues. In contrast, a message indicating that most Americans are hopeful about potential solutions to the environmental issues had no or even backfiring effects [60]. Thus, initial evidence suggests that, congruent with the well-established role of group-based anger as predictor of intentions to engage in collective action [30], group norms on collective anger may also increase collective climate action.

Emotions as predictors of collective climate action: field studies

While laboratory and social media-based research can yield important insights into the role of emotions in the context of collective action, they are often restricted to assessing the impact of emotions in artificial settings, on hypothetical outcomes, or on behavioral intentions. It thus seems important to complement a review of these findings with results from field studies on how group-level and collective emotions influence collective action in the real world. Due to the complexity of continuously measuring emotions in the field, systematic data about how collective emotions influence collective action in the real world are scarce. One notable exception is a minute-to-minute analysis of the crowd dynamics after the 2014 Ferguson police shooting based on real-time video recordings, social media posts, news stories, incident reports, and legal documents [61]. This analysis tracked how individuals who expressed anger influenced how specific scenes and actions (e.g. actions by the police) were perceived and interpreted by the attending crowd, how these emotions defined the emerging collective identity, and how the civil rights actions that

were formally initiated about 2 months after the shooting could be traced back to spontaneous collective anger during the first 48 hours after the incident.

While data at this level of resolution are rare, the recent rise in mass demonstrations and climate strikes has nevertheless resulted in substantial research on the emotional predictors of past and future participation in real-world collective climate action. For instance, multiple studies have surveyed participants in the Fridays for Future movement. One study surveyed 4057 Swiss individuals, assessing worry about climate change, group-based anger, and group-based pride, together with other social-psychological determinants such as social identity and efficacy beliefs. Worry about climate change was a significant predictor of participation in the climate strikes, even when controlling for the other social-psychological determinants in the complete regression model [62]. A study surveying 362 high school students from Norway found that collective guilt and perceived environmental threat predicted identification with Fridays for Future, which was directly related to future protest intentions [63]. A study surveying 500 young Germans identified anger about climate policy as significant predictor of participation [64]. A study of 638 Swiss university students found that protest enjoyment (how much they enjoyed taking to the streets in protest, being part of a movement, and challenging the established order) was the strongest predictor of having participated in protests as well as of future intentions to participate [65]. A study of 223 Germans showed that compared to non-participants, participants felt more anger toward the climate crisis and more positive emotions, such as feeling cheerful, delighted, and moved toward Fridays for Future and that the positive emotions predicted intentions for normative, nonviolent collective action [66]. In contrast to the demonstrations and school strikes conducted by Fridays for Future, the environmental activist movement Extinction Rebellion uses nonviolent civil disobedience such as blockading roads to protest climate change. A survey of 203 Extinction Rebellion activists from the United Kingdom tested the links between anger, hope, guilt/shame, key variables from the Social Identity Model of Collective Action, and past activist behavior and intentions for future activist behavior. At the level of individual intercorrelations, anger was positively correlated with past activist behavior, and anger, hope, and guilt/shame were positively correlated with intentions for future activist behavior. In the complete path model including all assessed predictors, only experienced anger remained a significant indirect predictor of past behavior and future intentions [67].

These studies illustrate that participation in the mass demonstrations organized by Fridays for Future is related to a diversity of experienced emotions, including anger, guilt, and worry, but also positive emotions related to

protest enjoyment. Participation in actions of civil disobedience in the context of Extinction Rebellion is best predicted by experienced anger, underlining again the potential of anger to specifically motivate collective protest behavior related to challenging the social status quo.

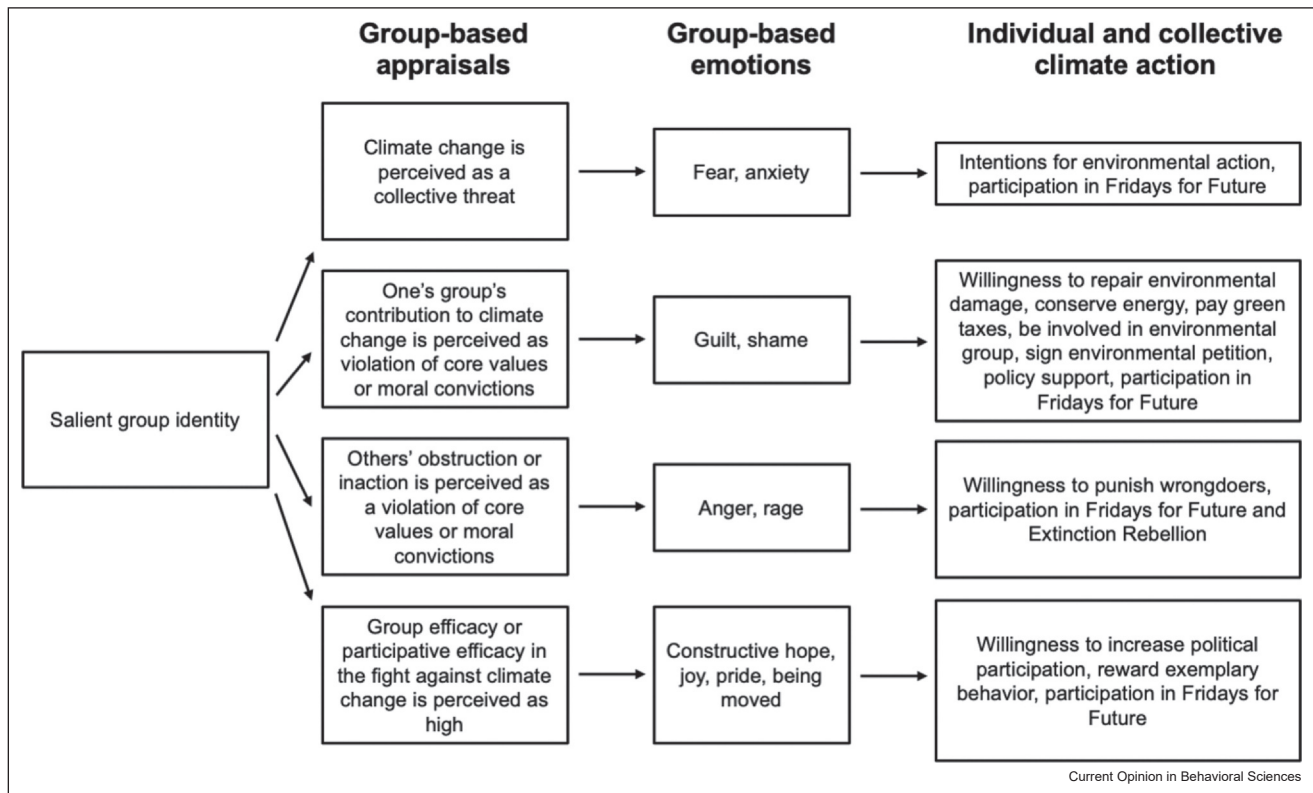
Discussion and outlook

The research reviewed here yields important insights into the role that collective emotional phenomena can play in the context of driving collective climate action. Group-based and collective emotions act at multiple levels and can be both conducive and obstructive to collective climate action. They can motivate individuals to take up collective climate action by overriding self-interested utility calculations and perceptions of individual powerlessness, they can help spread information about climate change, and they can increase group cohesion and identification. Consequently, they have been found to motivate a number of different types of collective climate action, ranging from increasing policy support to participation in mass demonstrations and civil disobedience movements (see Figure 2). However, emotions have also been found to reduce individual willingness to act, to induce complacency, and to emphasize and reinforce existing group divisions on the topic of climate change.

While these results point to pathways for leveraging the power of collective emotions to promote collective climate action, the empirical basis so far is relatively small and is strongly biased toward studies using self-reports and content analyses of produced texts. While self-report is the most convenient and most common way to measure a person's emotional experiences, it is important to keep in mind that emotional self-reports do not only reflect the actual emotional response, a relatively brief response occurring at the levels of physiology, motor activity, and subjective feeling (see Figure 1), but also reflect people's broader beliefs and lay theories about their own emotions [68]. In order to link research on climate emotions more strongly to current concepts and methods used in the affective sciences, future research should integrate additional ways of assessing climate-related emotions that go beyond self-report, for instance, by using neuroimaging approaches to assess the role of neural regions involved in appraisal, emotion, and decision-making [69], and using physiological measurements to assess psychophysiological reactions during emotional experiences [70].

Especially research on collective climate emotions would benefit from integrating measurements of the different emotion components in the field using ambulatory assessment approaches. Addressing the methodological challenges that occur when aiming to measure and understand the emotional experiences of multiple individuals simultaneously seems a worthwhile endeavor, especially when looking at the highly promising initial

Figure 2



Emotional pathways to climate action. Summary of the empirically shown links between group-based appraisals, group-based emotions, and their impact on individual and collective climate action as reviewed in the article. Note that the figure is illustrative rather than exhaustive.

research results that were obtained using survey approaches with participants of Fridays for Future or Extinction Rebellion. A better understanding of the mechanisms underlying collective climate emotions is a necessary precursor for developing effective intervention and communication strategies to leverage collective emotional responses to promote collective climate action.

Taken together, the available evidence suggests that collectively experienced emotions can play an important role in the context of collective climate action. Researchers, practitioners, and policy makers should consider the potential of collective emotional responses in their attempts to address one of the most important collective problem of our time.

Data Availability

No data were used for the research described in the article.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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