

Psychological responses to the proximity of climate change

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A frequent suggestion to increase individuals' willingness to take action on climate change and to support relevant policies is to highlight its proximal consequences, that is, those that are close in space and time. But previous studies that have tested this proximizing approach have not revealed the expected positive effects on individual action and support for addressing climate change. We present three lines of psychological reasoning that provide compelling arguments as to why highlighting proximal impacts of climate change might not be as effective a way to increase individual mitigation and adaptation efforts as is often assumed. Our contextualization of the proximizing approach within established psychological research suggests that, depending on the particular theoretical perspective one takes on this issue, and on specific individual characteristics suggested by these perspectives, proximizing can bring about the intended positive effects, can have no (visible) effect or can even backfire. Thus, the effects of proximizing are much more complex than is commonly assumed. Revealing this complexity contributes to a refined theoretical understanding of the role that psychological distance plays in the context of climate change and opens up further avenues for future research and for interventions.

Research on public perceptions of climate change often shows that people, at least in Western countries, typically perceive climate change as a distant threat, as something that affects strangers, and as something that happens in remote times and places, rather than in the here and now^{1–7} (for an exception, see ref. 8). This perception of climate change is problematic because it implies little personal relevance — which, in turn, is problematic because an individual's perception of being personally at risk can be an important motivation to take action against the source of that risk^{9–14}.

Consistent with this analysis, it has repeatedly been suggested that highlighting the proximal consequences of climate change could be an important part of strategies to engage and mobilize the public around this issue^{3,15–20}. Although the assumed psychological mechanism of proximizing is often not verbalized (see also ref. 21, where the term is used to describe a discursive strategy in which the speaker presents physically and temporally distant events as close and directly relevant to the addressee), the rationale behind proximizing climate change seems to be that this approach (a) decreases the psychological distance between the issue and individuals who could or should act^{17,22}, and (b) makes the consequences of climate change easier to visualize^{4,23} and more personally relevant^{24,25}. Moreover, proximizing climate change is believed to increase (emotional) concern^{16,22,26,27} and the feeling of being personally vulnerable^{23,27}; ultimately, these processes are expected to enhance people's motivation to act^{3,4,22–24,26,28}. The idea of focusing on proximal climate change to increase engagement with the issue is also consistent with the general tendency to attach a lesser value to the same outcome if it is seen to be further away in time, which is known as temporal discounting^{29,30}.

Despite the common sense appeal of proximizing³¹ and the frequent propositions to use this strategy to motivate action against climate change, relatively few studies have empirically explored its

effect. Moreover, the findings from those studies that have studied proximizing are inconclusive. One line of research that is useful in evaluating its role is to focus on personal experiences of events that are related to climate change. Although climate change is by definition a statistical concept (the average weather over several decades³²) and therefore cannot be experienced directly³³, people may still experience extreme weather events and considerable change in their local environment. To illustrate, one study found that Britons who had recently experienced flooding (a weather-related phenomenon expected to occur more frequently in Britain because of climate change) perceived their local area to be more at risk from climate change, were more concerned about climate change impacts, had higher confidence in their ability to mitigate climate change and were more willing to reduce their energy use in order to mitigate climate change than those who had not recently experienced flooding²⁶. Although some studies have revealed similar patterns^{34–36}, other work indicates that experiencing the impacts of extreme weather events does not necessarily increase concern and the willingness to respond to climate change^{37,38}.

The relationships between exposure to extreme weather events and the way people feel about climate change and possible response strategies become more consistent when an additional factor is taken into account: namely, how individuals interpret such 'climate signals'^{27,39}. People who report having experienced changes or events in the natural environment that they think were caused by climate change are more likely to believe that climate change is relevant to their local area and themselves^{40,41} than people who did not report such experiences. More specifically, experiencing phenomena attributed to climate change was associated with increased perceptions of personal and local risks from climate change^{40–42}, and higher levels of concern and worry about this threat^{40,41}. Last but not least, people who felt that they had personally experienced climate

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change through weather-related events or changes were more likely to support mitigation^{40,41} and adaptation⁴³ measures (for an overview, see ref. 27). These findings support the idea that bringing climate change psychologically closer can under certain circumstances have the expected motivational effects. However, the qualification above — that experiencing extreme weather events only increases levels of engagement with climate change when people attribute their experiences to climate change — highlights that additional psychological or ideological processes are at work that complicate the effects of such experiences^{40,41,44–47}.

A crucial question that follows from this analysis is to what extent researchers and practitioners can study the relationship between experiences with phenomena that people believe to be manifestations of climate change and people's readiness to engage with climate change. Many existing studies suffer from a range of methodological constraints simply because the researchers have had to capitalize, after the event, on unpredictable phenomena that have already occurred. As an alternative, some researchers have tried to induce risk-free experiences that are consistent with climate change predictions. For example, increasing the room temperature strengthens people's belief in climate change⁴⁸, and some studies suggest that the mere activation of heat-related associations has similar effects^{49–51}. To our knowledge, however, there is currently no evidence that these manipulations affect behaviour. More importantly, the finding that personal experiences have the most consistent positive effects when individuals attribute them to climate change^{40–42,44} raises the question of how deep and enduring the positive effects of incidental bodily sensations and implicitly activated associations are.

An alternative way to bring climate change closer to people is to reduce the psychological distance that people perceive when they think about this issue. Support for this idea comes from a study that explored how people perceived climate change relative to several dimensions of psychological distance. Concern about climate change increased if people were more certain it was happening, expected it to show effects sooner, and thought it was affecting their local area and people similar to themselves²⁸. But the same study found a counter-intuitive relationship between reported psychological distance and people's motivation to act: people who thought of climate change as a distant threat were more motivated to act²⁸. Findings from experiments where only psychological distance is varied and everything else is held constant also fail to consistently reveal the expected positive effects of proximizing. Of the three experimental studies we are aware of, two directly compared the effects of relatively proximal and distant descriptions of climate change (texts describing regional versus national climate change trends²⁴; texts, maps and photographs illustrating potential flooding caused by sea-level rise either with reference to the UK city where the study was conducted or with reference to continental Europe⁵²). However, these studies did not find the expected positive effects of proximizing on increased individual support for addressing climate change^{24,52}. A third study provided members of the general public with information posters describing either one broad global impact of climate change (sea levels rising) or a local impact specific to the area they lived in (one of the following three: forest fires, beetle infestation or rising sea levels). When climate change was described in proximal terms, it increased participants' willingness to address climate change relative to a control condition in which no information was provided²⁵. In contrast, people's engagement with climate change did not differ between the globally framed poster and the control condition. Because this study did not directly compare the proximal and distant frames, it is not possible to draw any conclusions about specific advantages of describing climate change in proximal terms relative to a more distant framing.

In sum, there is some evidence that people are more concerned about climate change and more willing to take action when they have experienced extreme weather-related events or changes, and when

they perceive climate change as psychologically proximal. However, attempts to capitalize on these interrelations have so far not consistently revealed the hypothesized effects on people's readiness to engage with climate change. The missing effects of such proximizing may, at first glance, seem counter-intuitive theoretically, as well as disappointing practically. On closer inspection, however, it becomes obvious that there is more complexity to how people engage with climate change than is commonly assumed — as exemplified by the finding that the motivational effects of personal experiences are contingent on people attributing these to climate change, something that cannot be taken for granted.

The next sections delve deeper into this complexity by applying three theoretical perspectives to the idea of proximizing. We show that, depending on the particular theoretical perspective one takes on this issue, and on specific individual characteristics suggested by these perspectives, proximizing can bring about the intended positive effects, can have no (visible) effect or can even backfire. In short, in light of this complexity, it should be less surprising that proximizing fails to consistently translate into increased willingness to act on climate change and to support relevant policies.

Information for decision-making

The first theoretical perspective that can help us to understand why proximizing may not directly increase individuals' willingness to act on climate change is construal level theory⁵³. In contrast to the underlying rationale of the proximizing strategy, this perspective does not suggest that thinking about an object or event as proximal rather than distant necessarily increases personal relevance — provided that the event or decision projected into the distance will still somehow and sometime become relevant to the individual^{54,55}. Instead, construal level theory argues that varying levels of psychological distance (for example, here versus far away; now versus in 10 years) influence how people represent objects and events mentally, and what information they consider when making decisions⁵³. Importantly, this does not mean that whether people think of climate change as a proximal or distant issue is irrelevant. Distance does play a role in how people relate to climate change and possible responses — but from the perspective of construal level theory the influence of perceived distance is more complex than suggested by the rationale behind proximizing.

Construal level theory is based on the assumption that humans can only directly experience the present situation, and that everything else needs to be mentally construed. To illustrate, directly experiencing a heat wave could mean standing in a crowded bus, being aware of the stale air and feeling the sweat trickling down one's body. Experiencing a bus ride like this offers a lot of context-specific information, including sensory reactions. The present situation is rich in details and involves little or no mental construal. In contrast, the anticipation of a heat wave in the future does not offer any context-specific information and does not create sensory reactions. In this case, it is necessary to mentally construe what experiencing a heat wave might look and feel like. The further away an object or event is from a person's present situation, the more effort is necessary to construe it, and the more abstract and generalized the resulting mental representation will be. In simpler terms, this means that when people think of an object or event as close versus distant, they form different mental representations of it.

An important function of psychological distance is that it influences what information people preferentially attend to when they think about (that is, construe) an object or event, and when they make decisions in relation to these. For example, people who think about a policy that is to be implemented in the near future tend to consider concrete circumstantial information such as other people's opinions when they evaluate that policy. In contrast, people who expect the same policy to be implemented in the more distant future base their evaluation on more abstract considerations such as their

values, which are commonly regarded as broad orientations that are relatively stable across time and different situations⁵⁴. The same pattern can also be found with regard to behavioural intentions: when intentions are represented in the near future, considerations about how convenient the behaviour is (that is, concrete, situation-specific information) better predict intentions, whereas personal values (that is, more abstract and generalized information) are better at predicting intentions in the distant future⁵⁶. In other words, construal level theory predicts that thinking about proximal versus distant climate change should interact with other things (for example, concrete and situation-specific versus abstract and generalized information) to determine individual responses.

Relating this line of research to the context of climate change implies that proximizing can have a variety of effects, depending on what information is routinely called upon when people make decisions that affect the environment. Importantly, working from this perspective, there are a number of reasons why proximizing might actually have negative consequences for action⁵⁷. First, the focal outcomes that motivate people when they think about climate change mitigation or adaptation generally correspond to their broader values and goals (for example, caring about others and the natural environment)⁵⁸. Following the above analysis, people who hold such values will act more in line with them when they think of climate change as a distant issue and think about it in abstract terms. In other words, for people who hold altruistic and biospheric values, proximizing should decrease the tendency to act on climate change because it draws their attention away from their values.

Second, when people are led to think about proximal climate change, they will focus more on situation-specific and concrete aspects of possible decisions, for example the relative costs and benefits of action or inaction⁵⁷. Shifting people's focus to these aspects is problematic because many of the concrete steps people can take to respond to climate change involve real and figurative costs (for example, inconvenience or physical effort)^{3,59} but relatively few direct or concrete benefits. In other words, if a focus on proximal climate increases the salience of costs and inconveniences of mitigation and adaptation options by comparison with benefits or conveniences, then proximizing may decrease the likelihood of people taking such steps⁵⁷.

Taken together, this line of thinking offers two important insights that researchers and communicators should take notice of. First, reducing the psychological distance of climate change should not have a direct effect on people's overall willingness to act on climate change *per se*. Instead, and second, variations in distance framing should influence what kind of information people consider when they make decisions about possible steps to respond to climate change. Thus, the effect of proximizing should depend on the information that is typically relevant when people with a proximal perspective make decisions (that is, concrete and situation-specific information such as whether the steps are inconvenient).

From local residents to global citizens

The second line of reasoning suggests that proximizing can, under some circumstances, be an effective strategy to increase action on climate change. More specifically, if an individual cares about a proximal place, messages that make threats to the place in question salient are likely to increase personal relevance and concern. But it cannot be taken for granted that people care about proximal places and the things that constitute them. Reciprocally, it cannot be taken for granted that people do not care about distant places and things, and would not take action on behalf of these.

This becomes obvious, for example, when looking at research into how much people care about different places⁶⁰. This research stems from environmental and social psychology, but also cognate disciplines such as human geography, sociology and anthropology. It shows that one person may, for example, have strong local roots

and be extremely attached to his neighbourhood or town while being indifferent to regional, national or international concerns. At the other extreme, a second person might travel the world a lot and see herself as a global citizen; this second person would be more likely to feel attached to places at larger scales such as a continent or even to the planet as a whole³¹. A third person may feel attached to multiple places at various spatial scales⁶¹, whereas a fourth person may feel detached at all scales⁶².

Thus, depending on how people relate to places at different spatial scales (for example, neighbourhood, town, region, country, continent, Earth), messages with different spatial foci will be more or less relevant to them. A person who is predominantly attached to local places will be more concerned about local (that is, proximal) consequences and more willing to protect those places^{63,64}. In contrast, a person who feels attached to the whole planet might be more concerned about what happens globally rather than more proximally³¹. And whereas a person who feels attached to multiple places will be concerned about each of these, a person without any place attachments will never be particularly concerned about what happens to a specific place.

A finer-grained analysis of what a place can mean to a person reveals a similar pattern. People care to different extents about the things that constitute a place. For example, some people appreciate the natural environment of a specific place and are interested in maintaining its integrity^{65,66}. People may also differ in terms of how strongly they like a place because they put different values on its symbolic meanings (for example, its historical or religious importance)⁶⁴. Last but not least, different degrees of fondness for a place may also vary as a function of how strongly individuals identify and feel connected with people who live in that place.

To summarize, research by psychologists as well as other social science disciplines has shown that people vary in terms of how strongly they feel attached to places and their constituents at different spatial scales. In terms of the proximizing strategy, this implies that the effectiveness of this strategy depends on how closely the entities being threatened by proximal climate change correspond to what people care about. That is, the more one is attached to a specific proximal place as a whole⁶⁰, and the more this place includes natural elements^{65,66}, symbolic meanings⁶⁴, and people one cares about and identifies with^{67,68}, the more likely one is to become concerned about and respond to a message that conveys a threat to these cherished things^{63,64}. By contrast, people who do not relate in any way to such a place will most probably remain unaffected by proximized messages.

This second perspective challenges the expectation that bringing climate change physically closer always translates into more concern and more action. According to this perspective, proximizing can in principle increase the extent to which people are concerned and willing to take action. But this effect should only occur when people care in one way or another about the proximal place.

Reacting to threats

The previous section argued that proximized climate change messages should only increase levels of concern and the motivation to act if the place in question is important to people. Somewhat paradoxically, a third line of reasoning suggests that messages could fail to increase people's motivation to act on climate change exactly when these messages are personally relevant. Different lines of research within psychology suggest that threatening information can be overwhelming when it is made personally relevant. This feeling of being overwhelmed can then trigger defensive reactions — which are helpful to reduce negative feelings but do not reduce the threat itself^{11,69,70}.

There are several arguments that support the idea that climate change may be perceived as a potentially overwhelming threat. First of all, even though some positive consequences of climate change

are expected (for example, increased agricultural yields in northern latitudes), globally and on the whole, negative consequences are likely to outweigh any positive benefits significantly. This view is presented not only in scientific reports^{71,72} but also in news coverage of climate change^{73,74}. This negative view is amplified by frequent portrayals of climate change as an impending catastrophe^{73,74}. More importantly, the conception of climate change as a negative issue corresponds with the typically negative associations and feelings that individuals report with regard to climate change^{6,7,17}. This negative connotation of climate change implies that proximizing this issue increases the salience of possible threats to the place in question (including everything that constitutes this place). To the extent that people care about at least some things or people that are threatened by proximal climate change, proximizing seems to be an effective strategy to make people realize that these things are at stake. Evidently, this realization will most probably conflict with what people also desire — for instance to know that they, their friends and family members, their homes and their possessions are safe — and evoke a state of aversive arousal^{69,70}.

So far, this analysis is consistent with the rationale underlying the proximizing approach: to increase action via higher levels of (emotional) concern^{16,22,27,28}. Although people may indeed change their behaviours when confronted with a threat, however, there are several reasons why they may respond to climate change in ways other than increased efforts to mitigate and adapt. For example, individuals may not always be clear about what they can do to effectively mitigate climate change^{75,76}. As a consequence, they may decide not to act at all¹¹. Further, people may not believe that their actions can make a difference^{3,59}, or may find that the required actions and changes are too difficult^{59,77,78}. If people lack confidence in the effectiveness of possible responses or their personal ability to act, behaviour change is unlikely^{11,12,79,80}. In this case, people need to employ other strategies to deal with the unpleasant feelings that proximal climate change entails^{11,69,70}.

One solution would be to change one's existing expectations and desires⁷⁰. For example, to stop caring about one's own safety or the safety of close others would resolve the conflict between safety concerns and knowing that climate change may adversely affect these important referents. But because people are typically motivated to retain their existing beliefs⁸¹, and because safety concerns for self and close others are a strong motivational force, using strategies to defend their beliefs is more likely than abandoning or revising them. For instance, people may intentionally avoid threatening information about climate change⁸² or avoid making inferences about its personal relevance⁸³. Another strategy that people may use to deal with threatening messages is to question or even reject them^{70,81} (that is, they may adopt sceptical beliefs about climate change; see for example ref. 84).

Last but not least, when people see climate change action as undesirable or when they feel that they are not able to mitigate or to adapt, they may deny responsibility for causing climate change (for example, "My contribution to climate change is minuscule") or for acting on climate change (for example, "It's up to large companies and governments to act")⁸⁵. Importantly, defensive reactions to climate change are not mere assumptions derived from related fields of research. There is empirical evidence suggesting that people use these strategies when they are confronted with threatening information about climate change^{3,6,84,86–88}. In other words, it is suggested here that the use of proximizing as a strategy may exacerbate existing tendencies to use these defensive strategies among people who care about the things, people or places threatened by proximal climate change.

Note that negative physical consequences to things people care about (for example, the integrity of the natural environment or the safety of friends) are not the only way in which proximal climate change can threaten people and trigger defensive reactions.

Climate change may also threaten psychological resources such as a positive self-view and the desire for stability. The implications for self-view may not be obvious at first. But consider, for example, that the contribution of individuals' actions to climate change and their potential role in mitigating climate change is emphasized in campaigns, media coverage and even in films (such as "An Inconvenient Truth"). It can therefore be assumed that people are aware that their own past and current behaviour contributes to the negative consequences threatening their proximal environment. Sharing responsibility for causing harm implies that one is an irresponsible, uncaring and morally questionable person^{89,90}. These implications may not only lead to unpleasant feelings such as guilt^{80,91}, they also conflict with people's desire to maintain a positive self-view⁹².

Related to this, proximizing climate change implies increased pressure for individuals to take personal actions. Many responses to climate change may, however, be interpreted as sacrifices and displeasing changes from individuals (for example, lifestyle changes such as reducing the consumption of goods or spending holidays at home rather than at remote destinations^{3,59}). Moreover, and maybe even more importantly, changing the practices and habits that cause greenhouse gas emissions is difficult⁵⁹ (see also ref. 77) and something that people feel is beyond their individual capacity³. Sticking to one's routines and habits is more appealing than taking on difficult and inconvenient lifestyle changes and less problematic for the self than acknowledging the harmful consequences of one's actions^{89,90}.

Defensiveness around one's self and one's choices is not only relevant when it comes to the personal self. Many people exhibit a similar defensiveness and reluctance to change with regard to the place^{93,94}, the social group⁹⁰ and the society⁹⁵ they are part of. People are generally attached to the socioeconomic status quo and motivated to justify and maintain it, a tendency that becomes stronger when people are faced with a threat^{88,95}. It is therefore likely that focusing on the negative consequences of proximal climate change, and one's own role in producing these⁹⁰, will bolster the tendency to adhere to the status quo and to reject appeals for change. This tendency might be further stimulated when one's socioeconomic system is being criticized for its role in causing climate change⁸⁸, because assuming (co-)responsibility for the adverse effects of climate change would be difficult to reconcile with the view of one's system as just, fair and beneficial⁸⁸.

Thus, climate change can also pose a psychological threat⁹⁶, for example, in the form of guilt^{80,91} and image threats to oneself⁹², to one's social group⁹⁰ and to one's socioeconomic system^{88,95}. Similar to physical threats from climate change, these psychological threats are likely to cause discomfort and to trigger coping strategies intended to reduce negative feelings^{69,70}. These coping strategies can in principle be 'corrective' in nature: that is, they can lead people to make amends for what they feel guilty for^{91,97}, or to change the aspects of the self⁹⁸ or the social group⁹⁰ that are causing the discomfort. But various preconditions need to be met for these corrective responses to kick in (for example, people need to assume responsibility^{90,98,99}, be aware of response options^{75,76} and believe in their efficacy^{3,11,59}). Moreover, the difficulties and inconveniences associated with the steps required to tackle climate change^{3,59,77} suggest that embracing these steps will not necessarily be the preferred reaction of most people who receive proximized climate change messages. In essence, this means that the threats that proximizing poses to psychological resources⁶⁹ may also trigger defensive strategies such as avoiding information about climate change or denying its relevance⁸⁷.

In sum, this third perspective suggests that focusing on proximal climate change increases the saliency of negative consequences for a specific place. To the extent that one cares about the place in question, or about the people who are implicated by that place, the

outlook of negative impacts will elicit a state of aversive arousal^{69,70}. Because this aversive arousal is unpleasant, people are motivated to reduce it^{69,70}. In line with the rationale underlying the proximizing approach^{16,22,27,28}, people would ideally respond with increased mitigation and adaptation efforts and thereby tackle the threat itself. But because people may see the changes required from them as ineffective, inconvenient or too demanding^{3,59}, they may turn to other strategies that effectively reduce unpleasant feelings^{11,69,70} but do not contribute to alleviating the negative consequences of climate change.

Thus, somewhat paradoxically, when people realize that climate change threatens things they care about, instead of taking measures to protect these things they may ignore the threat and risk losing what they hold dear. In other words, increasing the personal relevance of climate change by highlighting its proximal consequences can backfire.

Close to home

Despite being a plausible and common sense approach to increase individuals' motivation to act on climate change⁵⁷, bringing climate change closer psychologically has so far not lived up to expectations^{24,52}. Clearly, more research is needed to form a coherent picture of the consequences of proximizing climate change. In the absence of further empirical tests — and as a framework for stimulating these — we offer three theoretical perspectives as possible explanations for why this strategy may fall short of its promise.

First, rather than directly affecting people's motivation to act, proximizing changes how people mentally represent climate change and what information they base their decisions on. Second, proximizing only works if the places and things (encompassing people, flora, fauna and symbolic meanings) at risk from proximal climate change mean something to people — a precondition that cannot be taken for granted. Third, even if the things that are at risk from proximal climate change mean something to people, proximizing will only increase action on climate change if people think of possible actions as acceptable, feasible and effective.

The key lesson to be learned from these perspectives is simple: proximizing climate change is complex. Focusing on proximal climate change is likely to trigger various psychological processes that are expected to interact with people's existing thoughts, beliefs and preferences. At best, proximizing will be successful in encouraging people to take steps to mitigate or adapt to climate change. At worst, this strategy will lead to defensive reactions such as increased scepticism about the reality and relevance of climate change. In between these options, it is also possible that proximizing will change the frame of reference through which people think about climate change, but with no consequence for their level of action — thus rendering this strategy inert.

Despite these possibly undesired outcomes, our analysis is not suggesting that researchers and communicators should abandon the idea of motivating action through proximizing climate change. Each of the three perspectives presented above suggests that under some circumstances the proximizing strategy can be an effective tool to increase action on climate change. To employ this strategy effectively, however, its complexity must be acknowledged, and more research is needed to understand the individual and situational factors that aid and impede its success.

We hope that our reflections will contribute to more differentiated — and thereby more realistic — expectations about how proximizing affects people's motivation to act on climate change. This, in turn, should not only open promising avenues for future research but also help to avoid disappointment over unsuccessful research projects and ineffective interventions.

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Author contributions

A.B. wrote the first draft of the paper. All authors commented on the paper and refined it in response to the peer reviews.

Competing financial interests

The authors declare no competing financial interests.