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Sleepwalking into Disaster? Understanding Coping in the Broader Field of Mental Barriers. Examples from the Norwegian Arctic in the Face of Climate Change

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Abstract

Despite being one of the most urgent societal tasks of the 21st century, public engagement with climate change remains low. Mounting research illustrates, however, that there is a significant and growing number of local citizens who are informed about climate change, appraise it as a current, visible, local and personal threat, and express concern – but they fail to act. What prevents them from translating their concern into more widespread and offensive coping action? Structural barriers such as a lack of financial capital and outdated policies are a necessary but insufficient explanation. New perspectives are needed that integrate the role of mental barriers and insights from cognitive psychology and neuroscience into climate adaptation debates and nudge thinking in new directions. Against this background, the present chapter firstly seeks to advance the discourse on coping by discussing Lazarus and Folkman's (1984) prominent schematization of coping, appraisal and emotion from psychology. Conceptual key aspects are highlighted that help to explain the prevailing dissonance between concern and appropriate climate action. Secondly, based on these outlines and underpinned by my own empirical data on Arctic change in Norway, examples of coping in the broader field of mental barriers and their crucial relevance for practice are illustrated. The aim is to demonstrate the necessity and benefits for intellectual and policy systems of considering intrapsychic processes in climate adaptation. In this regard, selected policy considerations are discussed to indicate the possible scope of action and policy designs.

Key words

Climate change • Adaptation • Arctic • Coping • Mental barriers • Fisheries

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1 Introduction

“By the end of this century, the Arctic will be a very different place. Temperatures are warming more than twice as fast as they are for the planet as a whole. Sea ice is melting. Arctic wildlife and people are beginning to live altered lives.”

(WWF Global 2013)

“No no, I don't think about climate change because it will be a catastrophe.”

(Own interview with a fisherman from the Lofoten Islands, Norway, 2015; see section on “Empirical Data Collection”)

“We suggest that cognitive appraisal is the mediating process that sets the whole train of psychological events into motion, including coping activity”.

(Lazarus and Folkman 1984, p. 284)

Addressing global climate change and its impacts is undoubtedly one of the most urgent tasks and serious challenges facing humankind, policymakers and the science community today. Despite the fact that global climate change is a very complex, multifaceted and place-specific phenomenon, there is now broad-based consensus among nearly all scientists, scientific organizations and governments around the world that the current and projected increase of the earth's average surface temperature is largely due to anthropogenic greenhouse gas emissions and constitutes a significant threat to the planet and all human societies. The very recent and historic Paris Agreement under the umbrella of the United Nations Framework Convention on Climate Change (UNFCCC), negotiated in Paris in 2015 and adopted by all 195 countries, marks this joint awareness. It is the first-ever universal, partially legally binding global climate deal, demonstrating the unprecedented global and political acknowledgement of climate change as a common concern for humankind and the willingness of the world's nations to take common and more radical action.

However, as research illustrates, not only scientists, politicians and NGOs but also a significant and growing number of local citizens are informed about global warming processes, believe global warming is happening and consider it an important problem to be addressed. According to the latest international Pew survey, conducted in 40 countries in 2015, most nations polled believe global climate change is a pressing concern¹. Majorities in all 40 countries view climate change as a serious problem, and a global median of 54 percent regard it as a very serious problem (Pew Research Center 2015). A median of even 78 percent support their country's commitment to reduce greenhouse gas emissions as part of the Paris Agreement. Moreover, climate change is not considered a distant threat. Across the nations surveyed, 51 percent think people are already being harmed by climate change and another 28 percent expect harm in the next few years. Likewise, the recent Yale study on “Climate Change in the American Mind” reveals that the number of US-Americans who think global warming will cause personal harm has increased substantially from 36 percent in spring 2015 to 42 percent in autumn 2015 (Leiserowitz et al. 2015). There are still crucial differences between regions and countries and within nations, and public opinion still lags behind scientific conclusions (e.g. due to poor education, partisan-ideological or religious divides, perceived well-being, cohort influences). For instance, climate change concerns are more prevalent

¹ The climate change concern index, applied in this Pew study on global public opinion about climate change, is operationalized by three survey questions that ask about the extent to which people believe global climate change is a serious problem, is harming people now and will impact them personally at some point in their lives (Pew Research Center 2015).

in Latin America and sub-Saharan Africa than in the USA and China, and in general the political left is much more likely to view climate change as a major threat than the political right (for more sustained reflection on these interrelations see Gallup 2015; Pew Research Center 2015; Lee et al. 2015, presenting a 119 country survey; as well as Norgaard 2009 on previous studies on knowledge and concern regarding climate change).

What is striking, though, is that people who know about climate change, who appraise it as a current, visible, local and personal threat and who express concern, nonetheless make little effort to respond and translate their concern into continuous offensive and problem-focused coping activity (APA 2009, Gifford 2011, Marshall 2014). While information- and knowledge-deficit explanations are fundamental, they do not apply for aware and well-informed people (Lertzman 2015, Norgaard 2009). If then the lack of knowledge and information access fails to explain the dissonance between appraisal and appropriate climate action, how does it arise? Part of the answer lies in different, at times intertwined structural barriers such as economic barriers (e.g. insufficient financial capital to upgrade one's house to storm-resistant standards), political barriers (e.g. limited state support for investment credits in more energy-efficient fishing vessels), physical barriers (e.g. the difficulty of avoiding car use in remote areas) and socio-cultural barriers (e.g. national pride and tradition of supporting oil exploitation). However, many people, as Gifford (2013, p. 41) illustrates, do have the "structural capacity to act, but do not... or do much less than they could" (cf. also APA 2009). With so much at stake, why do people fail to act? And, just as important in light of the urgent need for climate action, is there anything that can be done or are we, to put it somewhat polemically, sleepwalking into disaster?

One key question related to climate change has only recently been addressed more profoundly and nudges thinking in new directions: What is happening in people's brains? What kinds of mental barriers or psychological "dragons of inaction" (Gifford 2011, p. 290) prevent people from confronting the threat and interfere with offensive coping? (Lertzman 2015, Marshall 2014, Norgaard 2009). Mental barriers (here synonymous with psychological barriers) refer to any cognitive and emotional process in the human mind that keeps people from doing something specific or changing their behavior. These mental obstacles are not completely restricted to the individual (APA 2009). Instead, they are likely to interfere dialectally with structural barriers, but what does this interference look like? To date mental barriers have been less well documented and acknowledged than structural ones and have as yet been insufficiently addressed by climate policy and decision makers (Norgaard 2009, Lertzman 2015). However, in order to better understand how to get people to act more offensively, we must also look at the intrapsychic reasons for people's inaction or restricted behavior. A perspective is thus needed in which insights from psychology and neuroscience are more deeply integrated into overall investigations of exposure, sensitivity, barriers and coping responses. Analyzing coping activity and its complex facets in the broader field of mental barriers and the role of internal processes such as cognitions (e.g. appraisals: Is there threat and what can be done?), emotions (e.g. hopelessness increases the likelihood of giving in to despair and resignation) and intrapsychic coping (e.g. reappraising) is crucial. Only so can we improve understanding of how to translate concern about climate change into a more widespread and effective coping response.

Against the backdrop of these research needs, the intention of this chapter is twofold. Firstly, it seeks to advance the conceptual discourse on coping by discussing in detail insights from cognitive psychology. Elaborate emphasis is thereby laid on Lazarus and Folkman's (1984) prominent schematization of coping, appraisal, and emotion, which has not yet been adequately recognized

in the climate change debate. Conceptual key aspects are highlighted that help to explain dissonance between concern and appropriate climate action. Secondly, based on these outlines and underpinned by my own empirical data on Arctic change in Norway, examples of coping in the broader field of mental barriers and their crucial relevance for practice are illustrated. The fishing communities on the Lofoten Islands face the particular harm and risk of shifting fish migration, altering fish-stock levels, and extreme weather and storms due to rapid Arctic change. A crucial aim of this chapter is to demonstrate the necessity and benefits for intellectual and policy systems to consider intrapsychic processes in climate adaptation, by arguing both from conceptual and case study evidence. Concluding insights into selected policy considerations are provided to indicate the possible scope of action and potential policy designs. In fact, recommendations need to take into account local conditions and context-related cross-scale interlinkages between the local, national and global scales. Obviously, there cannot be a one-size-fits-all solution. Nevertheless, the exemplified suggestions might inspire new ideas, boost creativity and stimulate novel perspectives on how to reduce the gap between concern and efficient response in climate change contexts.

2 Conceptual considerations from cognitive psychology

2.1 The notion of coping

Coping can be seen as a key concept for theory and research on adaptation. As documented by contemporary academic debate, there is broad scientific agreement that coping is not an individual endeavor since it does not occur in a (social) vacuum. Instead, it is a complex, multidimensional process that is sensitive both to the environment and its demands, constraints and resources, and to individual capacities, demands, constraints, beliefs, goals and values. People are, as Aldwin (2007, p. 92) representatively summarizes, “neither passive responders to environmental circumstances nor are they guided solely by inborn temperament”. They actively select and shape their environment. This viewpoint that coping emerges from the dialectic interplay between person and environment variables constitutes the fundamental proposition of Lazarus and Folkman’s (1984) well-known and widely cited schematization of coping modes and functions, appraisal components, emotions and their reciprocal relationship. The way in which their approach specifically helps to analyze coping in the broader field of mental barriers is discussed below in greater depth. It is important to recognize that due to its dialectic and relational point of reference, and its epistemological, process-oriented and action-centered holistic outlook, Lazarus and Folkman’s conceptual framework is still one of the most approved and referenced approaches (Cooper and Deve 2005). Complemented by more recent neurobiological findings, for example on the complex interplay of slower, conscious reason and quicker, subconscious emotion (i.e. feel first and think second; cf. LeDoux 1996), Lazarus and Folkman’s conceptualizations have served as a scientific basis for a great number of contemporary studies (cf. e.g. Aldwin 2007, Eppel 2007, van der Linden 2015).

2.1.1 Core themes

In particular with regard to the concept of coping, following Tennen et al. (2000), Lazarus and Folkman (1984, p. 141) offer the most widely accepted definition of coping: “We define coping as constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person.” This wide-ranging

definition contains four interrelated core themes. These aspects and their implications for understanding coping in a broader field of mental barriers are discussed in the following.

Process orientation

According to their above-cited definition, Lazarus and Folkman (1984) regard coping as process- rather than trait-oriented, as reflected in the words “constantly changing” and “specific” demands. They do not argue against the influence of personality dispositions or traits (e.g. favorable ways of thinking like optimism) on coping thoughts and the formulation of stable coping styles over time and across conditions (cf. also Lazarus 1999). Likewise, they acknowledge that people do have personally preferred modes of coping with the same or similar sources of stress or adversity. However, by referring to empirical evidence, the authors demonstrate the predominant limitations of trait conceptualizations and their insufficient compliance with the complexity and variability of actual coping efforts (e.g. trait concepts ignore goal-oriented intentions shaped by environmental factors). As emphasized by Lazarus (1999), in accordance with a dialectic outlook, no person or environmental variable acts alone, but each interacts with other people and/or environmental variables and thus contributes to coping behavior. In line with this argument, coping thoughts and actions are always directed towards a specific demand. Hence, “to speak of a coping process means speaking of *change* in coping thoughts and acts as a stressful encounter unfolds” (Lazarus and Folkman 1984, p. 142; original emphasis). Applied to climate action discourses, it is thus vital to consider coping as a shifting process. At certain times, for example, people rely more heavily on offensive problem-solving strategies and at other times on defensive coping modes, as the status of the person-environment relationship changes. Decisions about coping actions vary in accordance to changing resources, ways of thinking (primary and secondary appraisals, see below) and emotional experience. Based on reappraisals, for instance, which refer to a modified appraisal due to new information or feedback from the environment, new coping options might be considered. This standpoint is particularly important for developing policy recommendations and climate change communication (e.g. framing information in ways that trigger reappraisals, see below).

Cognitive and behavioral coping modes

To avoid restricting coping analysis to observations of behavioral coping efforts, which are (more or less) directly observable by others, and discounting “invisible” but extremely important intrapsychic coping modes, Lazarus and Folkman (1984) use coping to refer to both “cognitive and behavioral” efforts. Cognitive coping processes include all ways of thinking oriented to the problem caused by a troubled person-environment relationship (e.g. reappraising, accepting or trivializing a demand) and/or to its emotional consequences (e.g. regulating fear through denial, avoidance or intellectualized detachment). Evidently, a gap between concern and offensive coping does not necessarily imply a lack of coping. How mental barriers are likely to impede more offensive and behavioral coping efforts by the complex interlay of cognition and emotion is exemplified in a later section.

Independency from outcome

By defining coping as “efforts” to manage, Lazarus and Folkman (1984) point out the importance of studying the process of coping independently from its outcomes. This unbiased perspective allows coping to “include anything that the person does or thinks, regardless of how well or badly

it works” (ibid. p. 142). Accordingly, no coping mode is considered inherently better or worse than any other. Instead, the specific person-environment relationship must be taken into account to judge whether a certain coping mode or process fits with both the personal and environmental factors of that relationship (e.g. individual resources, constraints, institutional conditions). A coping mode that is effective at one stage can be ineffective at another, and vice versa. The timing of denial, for example, illustrates this point. For instance, denial of climate change may be less harmful and more beneficial in the early stage of adversity (e.g. sudden flooding or storm), when the encounter provokes an extreme stress experience and fear, than in later stages (Filipp and Aymanns 2010, Lazarus and Folkman 1984). Denial can thus be beneficial as an initial protective response, as it provides time to control emotions of panic. In this way, cognitive strength is increased, which facilitates concentrating all efforts and resources on managing initial flood or storm damage without being paralyzed by fear and overburdened by acknowledging that climate change exists, making even more serious damage likely in the future (cf. also section “Background and the Challenges Ahead”). At a later stage, however, it is essential to face and engage with climate change. Otherwise, denial could delay or prevent a person from trying more productive coping activities in a situation that can be improved. Correctly interpreting such processes can help policymakers from confusing people’s denial with a lack of caring or political will. In addition, this example serves to demonstrate the aforementioned necessity of a process-oriented approach. Coping needs to be “studied in slices of time so that changes can be observed in what is thought, felt, and done as the requirement and appraisals of the encounter change” (Lazarus and Folkman 1984, p. 317). Consequently, what is needed are principles that guide and specify the conditions under which a coping mode might have favorable or unfavorable outcomes.

No mastery

By using the less-specific term “manage” in connection to dealing with demands, Lazarus and Folkman (1984) avoid equating coping with mastery over the environment or oneself, as not all sources of external or internal demands are amenable to mastery, but need to be coped with (e.g. changing patterns of fish migration, inevitable losses, diseases, ageing). Applied to the analysis of climate action, an overly narrow understanding of coping as mastery, which implies complete control of a person-environment relationship, would solely focus on coping as *problem-solving*. This would result in the neglect of important coping modes concerned, for instance, with regulating emotions (as in the case of time-limited denial mentioned above), maintaining self-esteem and a positive outlook, especially in the face of climate situations that are uncertain, ambiguous, irremediable or difficult to predict. Therefore, as highlighted by Lazarus and Folkman (1984, p. 142), “managing can include minimizing, avoiding, tolerating, and accepting the stressful conditions as well as attempts to master the environment”.

2.1.2 Coping functions

An important feature of Lazarus and Folkman’s conceptualization of coping, which is consistent with its process-oriented, cognitive-behavioral and outcome-independent outlook, is the distinction between two major coping functions: problem-focused and emotion-focused. In contrast to a coping outcome, which refers to the effect of a coping mode, a coping function relates to the purpose a coping mode serves (Lazarus 2003). For example, the coping mode “seeking information on local climate change impacts” can have the functions of generating coping ideas based on more information and reducing emotional concern (which might positively affect stress appraisals, for example a change from threat to challenge appraisal; see below). Yet the outcome

may not be emotional relief but even more concern due to fear-inducing communication on climate change (cf. later section for more details), which can negatively influence appraisals of coping options (e.g. the threat is too great to be met with available resources) and the resulting coping behavior (e.g. avoiding threat through profound denial or distancing).

With respect to the problem-focused function, the purpose is to actually change a troubled person-environment relationship, that is managing or altering the problem causing stress or adversity, by acting on the environment (altering economic barriers, procedures) or oneself (e.g. learning new skills, readjusting attitudes and goal hierarchies). In contrast, the emotion-focused function is not aimed at changing the actual person-environment relationship in question. Instead, it targets the person's cognitive effort to regulate the emotions tied to that troubled relationship by either a) changing the way the adverse relationship with the environment is attended to (as in vigilance or avoidance), or b) changing the relational meaning of what is happening (by reappraising it), which modifies emotional experience even though the actual conditions of the relationship have not changed (e.g. deciding there are more important things to worry about than climate change). For example, a threat that a person successfully avoids thinking about, even if only temporarily, no longer causes concern. Similarly, the reappraisal of a threat in nonthreatening terms removes the cognitive basis of being concerned (Lazarus 1999). Importantly, however, Lazarus (1999) stresses the fact that, although conceptually distinguishable, problem- and emotion-focused coping are interdependent and work together: "Both are essential parts of the total coping effort, and ideally facilitates the other. It is the fit between thinking and action – that is, the balance between them and the environmental realities – which makes coping efficacious or not" (ibid. p. 124). The case study examples under consideration further demonstrate the importance of considering coping functions in climate adaptation.

2.2 The notion of appraisal

A core tenet of Lazarus and Folkman's notion of coping is that the way a person appraises an encounter influences if and how he or she will cope. "The essence of my theory [...] is the process of *appraisal*, which has to do with the way diverse persons construe the significance for their well-being of what is happening and what might be done about it, which refers to the coping process." (Lazarus 1999, p. 9; original emphasis). This statement highlights Lazarus and Folkman's cognitive-phenomenological frame of reference, which regards the concept of relational meaning that an individual constructs from the person-environment relationship as the most important theme in emotion and coping response.

2.2.1 Relational meaning

Relational meaning refers to the person-environment relationship as being combined with the subjective process of appraising, which is centered on the personal significance of that relationship. In other words, personal variables and those that characterize the environment dialectally come together in the relational meaning that, in turn, depends on the appraisal process through which that meaning is constructed. And this meaning is, as Lazarus (1991) proposes, the crucial cause for emotion and (varying) coping responses.

Before elaborating further on this relationship and different kinds of appraisal, it is necessary to elucidate the relevance of relational meaning to climate change research and the implementation of suitable policy recommendations. The crucial point is the difficulty of understanding the harm

and threat of climate change from the standpoint of the person *or* the environment *per se* (cf. also APA 2009, van der Linden 2014). Arguing from Lazarus and Folkman's constructivist perspective, the relational meaning of climate change needs the "conjoining of both by a mind that considers both the environmental conditions and properties of the person in making an appraisal of being threatened" (Lazarus 1999, p. 12). Although climate change is a physical process, it is driven by and understood through social and political processes, including appraisals of events discussed in the media or climate programs. Climate change is fixed in place and meaning only for the moment.

Without a goal at stake, however, there is no potential for loss or concern. Lazarus and Folkman (1984) illustrate that a person is under stress or experiences negatively toned emotions (e.g. concern) only if events negate or endanger important personal goals and commitments or violate highly valued expectations. In this sense climate change can be thought of as a potential threat that is transformed into an active threat or concern when that which is considered of importance is jeopardized. Importantly, this relational approach acknowledges environmental *and* personal characteristics and their relative significance based on cognitive mediational processes that negotiate between and integrate these two sets of variables. "We suggest that *cognitive appraisal* is the mediating process that sets the whole train of psychological events into motion, including coping activity, the emotional reaction, and the somatic changes that are part of any stress state." (Lazarus and Folkman 1984, p. 284; original emphasis). Human judgements about climate change are important because they affect both levels of concern and the motivation to act (APA 2009). However, mental barriers such as a lack of perceived behavioral control ("I'm only one person, what can I do?"), social comparison ("Why should I act if *they* won't act?"), distrust ("I don't change because their recommendations have failed before.") or tokenism ("I'm a member of the Fishermen's Association, so I've done my part.") drive appraisal and, in turn, coping activities (cf. also Gifford 2013).

2.2.2 Primary and secondary appraisal

Lazarus and Folkman (1984) use the pleonastic expression of "cognitive appraisal" to emphasize appraising as a continuously changing "set of cognitive actions" (Lazarus 1999, p. 75) or judgments. Appraising is understood as a multifaceted, evaluative mental process that is involved in categorizing the flow of events and their various facets with respect to their implications for well-being and coping behavior. Such processes can be, as they state, both deliberate and largely conscious (e.g. when new and complex demands require a slow and deliberate evaluation of available coping resources), and intuitive, automatic and unconscious (e.g. when previous experiences with a certain threat provoke associated coping modes without the need for extensive reflection or learning; cf. Lazarus 1991 for more detail).

In order to facilitate the analysis of the complex and multilayered process of coping and emotion, Lazarus and Folkman (1984) make an analytical distinction between two kinds of appraising: primary and secondary. These two kinds have different functions and deal with different sources of information, although they operate interdependently and can appear simultaneously. Their consideration is particularly important for climate action advocates and policymakers, because, as detailed below, it enhances understanding of a mismatch between problem awareness and concern on the one hand and maladaptive coping activities or inaction on the other. Primary appraisal relates the event to its significance for the person's well-being and is thus concerned with the motivational relevance of what is happening, that is, whether anything is at stake. "Do I have a

goal at stake, or are any of my core values engaged or threatened? And if there is a stake, what might the outcome be?” (Lazarus 1999, p. 76). According to Lazarus and Folkman (1984), a person may appraise a given event in three different ways: as irrelevant (no implication for well-being, no concern about climate change), as benign-positive (positive implication for well-being, no coping required, positive emotions such as happiness or exhilaration) and as stressful.

Primary stress appraisals are of particular relevance for this chapter’s topic. They involve a negative evaluation of one’s present or future state of well-being and evoke (except for a challenge appraisal) negatively toned emotions such as fear, anxiety, guilt, anger or sadness. Following Lazarus and Folkman (1984), stress appraisals are of three broad categories, namely harm/loss, threat and challenge. While harm/loss relates to damage that has already occurred, threat concerns harm/loss that has not yet happened but can be anticipated. In comparison with harm/loss, threat permits anticipatory coping. To the extent that people can anticipate the future, they generally have a chance to prepare themselves for approaching difficulties and to plan for future occurrences (Lazarus and Folkman 1984). Challenge, the third type of stress appraisal, focuses on the potential for gain or growth inherent in a situation. To be challenged implies feeling positive about demanding events and refers to pleasurable emotions such as eagerness or excitement. Nevertheless, Lazarus and Folkman (1984) see challenge as a stress appraisal because the person must mobilize coping efforts in order to produce a positive outcome. At the same time, there must be some risk of harm to have the experience of challenge. In particular, the consideration of challenge in contrast to threat has important implications for climate policy recommendations.

In addition to the stake a person has in an encounter, evaluations are required about whether anything can be done to manage or improve the troubled person-environment relationship, and if so, which coping options might work. This type of evaluation is called secondary appraisal: “Do I need to act? When should I act? What can be done? Is it feasible? Which option is best? Am I capable of doing it? What are its cost and benefits?” (Lazarus 1999, p. 78). Secondary appraisal is vital in shaping the coping activities and refers to a complex evaluative process that considers available coping resources and options, timing and coping potential, which is the likelihood that a given coping option will accomplish what it is supposed to. Secondary appraisal is thus a crucial supplement to primary appraisal since irrelevance, benignity, harm/loss, threat and challenge depend also on how much control a person thinks he or she can exert over outcome. How cultural values and beliefs can act as a mental barrier and influence secondary appraisal is described later.

Primary and secondary appraisal permanently interact with each other in shaping the meaning of a person-environment relationship and the strength and quality of the emotional reaction (Lazarus and Folkman 1984). The assumption that cognitive evaluations such as appraisals cause emotion is a fundamental part of Lazarus’ schematization of cognition and emotion (Lazarus 1991). He argues that “the way we evaluate an event determines how we react emotionally” (Lazarus 1999, p. 87) and that the resulting emotion is likely to influence later appraisals reciprocally. Fear, for example, is experienced when an individual faces uncertain, existential threat (primary appraisal) and at the same time anticipates probable failure in efficient coping (secondary appraisal). However, the stronger the experience of fear, the faster and less smart can be the interplay between emotions and cognitions (LeDoux 1996). Referring to evidence from neuroscience, this process and its role as a mental barrier is further addressed later.

The perspective of emotion as a post-cognitive process has received substantial empirical support (cf. e.g. Scherer, Schoor and Johnstone 2001, Siemer, Mauss and Gross 2007). On the other hand,

however, there is also strong empirical evidence that, for example in threatening fright-flight situations, emotions occur without preceding cognitions (for more sustained reflection see LeDoux 1996). Yet, in line with Helgeson et al. (2012) and van der Linden (2014), it is, in contrast to such situations, more likely that a causal attribution of personal well-being to complex climate change consequences necessitates cognitive appraisals. It is important to recognize though that both viewpoints have validity and are not mutually exclusive. In fact, the debate on the relationship between cognition and emotion greatly depends on how these concepts are defined and operationalized. Crucial for the present topic is that coping with climate change and the influence of mental barriers cannot be properly understood without considering intrapsychic cognitive processes such as primary and secondary appraisals, emotions, problem- and emotion-focused coping functions and, furthermore, that person, environment and coping mutually influence one another in a process that evolves over time.

3 Lofoten Islands cod fisheries in the face of Arctic climate change

3.1 Background and the challenges ahead

The Arctic belongs to one of the most complex and rapidly changing and most vulnerable regions on earth (Sommerkorn and Hamilton 2008). In particular, the Barents Sea marine living resources and the coastal fishing communities on the Lofoten Islands in the Norwegian Arctic are severely affected by rising atmospheric and oceanic temperatures, a dramatic decline in sea ice extent and volume, food web modifications, loss of traditional hunting and fishing routes, the altering of biographical careers and lifestyle patterns, and the shifting migration of both people and animals (ACIA 2005, Øseth 2011).

The Barents Sea is the main nursery area for economically and ecologically important fish stocks such as North East Atlantic (NEA) cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*), which spawn along the coast from the Lofoten Islands to Troms county in the north of Norway (Norwegian Ministry of the Environment 2012). According to figures from Statistics Norway (quoted in *ibid.*, p. 55), the total landed value of the fish catch in the Barents Sea-Lofoten area was NOK 6.3 billion in 2009 (approx. EUR 748 billion), or 56 percent of the total landed value for Norwegian fishing vessels. The fisheries sector accounts for 4.7 percent of employment in North Norway, as against 1 percent for the country as a whole. In some Lofoten Island communities, such as Røst, Værøy and Moskenes, the fisheries industry even accounts for over 40 percent of total employment (Norwegian Ministry of the Environment 2012). These figures illustrate the importance of marine ecosystem services for value creation and society and thus make evident the crucial need to analyze the impacts of Arctic change on fishers' livelihoods on the Lofoten Islands and their coping response. These islands were home to around 24,500 people and 892 registered full-time fishers in 2015 (Directorate of Fisheries 2015).

In particular, the historic Lofoten winter cod fisheries and traditional production of the world-famous stockfish (air-dried cod fish) can be documented back about 1,000 years to the time of the Vikings, and are vital for settlement and employment structures, coastal culture, identification and the local, regional and global economy. Benefiting from the warm North Atlantic Current and the resulting rich cod fish stocks and favorable outdoor drying conditions in the winter period from January to April (perfect mixture of wind, frost, rain and sun), the Lofoten Islands are the only place on Earth where the production of first quality stockfish is possible. However, observed and

projected climate-change impacts bear the risk of weakening Lofoten's unique position in cod fishery and, to follow Lazarus and Folkman's coping notion (cf. Section 2.1), thus creating demands that are appraised by the local inhabitants as taxing or exceeding their resources. Full-time small-scale coastal fishers, especially, with small fishing vessels less than 28 meters long, conventional gear and fishing grounds within 12 nautical miles of the outer coastline, depend heavily on the Lofoten winter cod fishery. On average, 80 percent of their annual income is derived from catching and selling cod to local fish buyers (interview with Norwegian Coastal Fishermen's Association and coastal fishers in 2015; cf. Section 3.2 on data collection).

Despite profound uncertainty about the details of future development and the magnitude, rate and quality of impacts (e.g. the decline in sea ice has been faster than predicted, cf. Sommerkorn and Hamilton 2008), there are crucial indicators of changes today that will increasingly challenge Arctic people to adapt (West and Hovelsrud 2010). According to a recent survey by Fossheim et al. (2015), global warming led to a temperature increase of 1 degree Celsius in the Barents Sea from 2004 to 2012. And further temperature rises are projected. As a consequence of warming, a northward shift in the NEA cod spawning and feeding locations towards colder waters is very likely, which would cause a significant decrease of cod spawning in the Lofoten area (ACIA 2005). These changes in cod migration patterns have especially dramatic impacts on local fish buyers and fish processors and, above all, on the livelihoods of small-scale fishers who operate close to the Lofoten coastline and are not able to access cod fishing grounds offshore and further north due to small vessel size and limited equipment. Furthermore, negative spin-off effects on other sectors are expected, including employment in local shipbuilding or marine technical supply companies. In the light of these challenges, it is particularly valuable to investigate what kind of relational meanings the coastal fishers construe from their person-environment relationships. Or more specifically, what kind of primary appraisals and secondary appraisals do they have, and if mental barriers exist, how do they interfere with coping activities?

3.2 Empirical data collection

The abovementioned research question was addressed within a larger study on Arctic change, resilience and translocal relations between fishers on the Lofoten Islands in 2015, funded by the German Fritz Thyssen Foundation. The empirical results presented in this paper are based on an iterative and qualitative-interpretative research design that focuses on meaning in context and aims for a broad and in-depth understanding and elucidation of human experience, behavior and the reasons that govern such behavior in the face of Arctic change. Local feedback and input from different stakeholders have been fundamental for critical reflexivity and refining the research scope throughout the research process. The main sources of information about local knowledge and appraisals are transcriptions of interviews, discussions with key informants, participant observations, social and cultural gatherings, and extensive site-inspections. Two field trips to the Lofoten Islands were undertaken in the spring and autumn of 2015, lasting four months in total. Within this timeframe, 43 problem-centered interviews with narrative sequences were carried out in English on the Lofoten Islands; 31 of these with small-scale fishers, the rest with fish buyers, other local residents, environmental charities and organizations, representatives from the communities as well as with fisheries officials (e.g. Norwegian Coastal Fishermen's Association/*Norges Kystfiskarlag*). The results from the fieldwork were analyzed in close conjunction with a literature review on fisheries management and Arctic change on the Lofoten Islands.

4 Coping in the broader field of mental barriers

Within the course of empirical research on the Lofoten Islands, it became evident that about half of the interviewed small-scale fishers have profound local experience-based knowledge and accurately identify climate change as a crucial driving force for their altering person-environment relationships. As meteorological parameters specifically determine when, how often, how long and at what risk they may leave the harbours to go out to catch fish at sea, they pay close embodied attention to local weather conditions. According to their observations, that are broadly consistent with scientific findings and the results of similar studies (cf. e.g. ACIA 2005, West and Hovelsrud 2010), the warming ocean affects the distribution and abundance of cod fish stocks and leads to an increased influx of southern species such as mackerel (*Scomber scombrus*) and blue whiting (*Micromesistius poutassou*). Shorter winter seasons, higher winter temperatures and more winter rain influence the onset and quality of the stockfish production. Moreover, the interviewed fishers observe a rise of sea-level, storms and polar lows that negatively affect landing and fish processing facilities, transportation and supply chains, fishing nets left out overnight, weather predictability and the safety of sea navigation.

Obviously, climate change is not abstract and distant from the daily lives of the fishers. They are exposed to and vulnerable to various kinds of climate change impacts and, as they state, extremely concerned about their future lives as coastal fishers. Similar to the participants of the Pew survey mentioned above, their primary appraisal (appraisal of well-being) relates to concrete harm/loss (e.g. less days at sea due to hazardous conditions) and to salient threat (e.g. stronger northward shift of cod spawning grounds). However, despite considering climate change as causing major harm and threatening their livelihoods, they seem to be restricted in translating their concern into offensive intrapsychic and behavioural problem-focused coping (e.g. changing their goal hierarchies and attaching greater importance to alternative sources of income). It is important to recognize that other structural barriers exist and affect coping activities (e.g. lower market prices for other fish than cod make a shift toward targeting other species less attractive). Besides, the other half of the interviewed fishers interpret weather changes in the context of natural climatic variability and thus do not appraise their well-being as being negatively affected by anthropogenic climate change. They are, as they explain, experienced with and accustomed to the large weather perturbations that have always existed. Assumingly, this kind of relational meaning gives them a sense of invulnerability or resilience. Likewise, they attribute the cause of past and current cod fluctuations to natural variation and human-induced overfishing and ship sewage pollution. These findings, and the human tendency to appraise natural risks as less threatening than human-made risks, however, are not new and have been discussed elsewhere in considerable depth (cf. e.g. Marshall 2014, West and Hovelsrud 2010). For this reason, the present chapter rather focuses on the so-far insufficiently addressed interplay of concern, mental barriers and limited offensive coping.

4.1 Weak cognitions and hard-wired emotions

The analysis of the fishers' interview statements regarding their concern about climate change impacts reveals that defensive cognitive coping modes with an emotion-focused function are widely applied. These modes aim to regulate the negative emotional response of concern and fear to the troubled person-environment relationship, through either reappraisals (i.e. changing the relational meaning of that relationship) or avoidance (i.e. efforts to avoid dealing with the demand). For example, reappraising ("There are more important things to concern about.") or avoidance in

terms of shifting responsibility (“The Fishermen’s Association will take care about it.”) and ignoring (“I refuse to think about it.”) illustrate that the interviewees have a significant goal at stake, specifically, to continue to earn a living from cod fishing. However, there is no guarantee that they will achieve this goal. What kinds of processes operate in their brains that help to explain their prevailing emotion-focused coping modes? Or, more specifically, what kind of mental barrier limits more widespread offensive coping on the part of the fishers for whom such coping is feasible?

The answer can only be approached by drawing on knowledge from cognitive psychology and neurobiology. Within these disciplines there is consensual evidence that human risk and threat perception relies on two qualitatively different neural processing systems (Epstein 1994, Kahneman 2011, LeDoux 1996). One – involving the brain’s neocortex – is cognitive-analytical, deliberate, rational and slow. It requires conscious effort and encodes reality in words, numbers and abstract symbols. The other – belonging to the evolutionary older brain’s subcortical structures (especially to amygdala circuits) – is experiential-emotional, associative, impulsive and fast. It maps experienced, uncertain and adverse aspects into emotional responses (especially fear and anxiety) and is also quick to apply mental shortcuts in order to reach quick conclusions (e.g. in phobic reactions). In practice, both systems continually interact and function in parallel to guide human behavior and decision making (Damasio 1994, for further information see LeDoux 1996). According to Lai et al. (2012), the way in which these two systems (cognition and emotion) affect each other is strongly dependent on the context (e.g. simple vs. complex risk).

With regard to climate change, my empirical results strongly suggest that a post-cognitive process prevails. This is consistent with Lazarus’ appraisal theory as discussed in Section 2.2, and with similar findings from van der Linden (2014) and Helgeson et al. (2012). Hence, the fishers first perceive and consciously appraise the impacts of the climate change they experience in terms of personal significance and available resources. And these primary and secondary appraisals (of threat and lack of coping options) lead, in turn, to concern, fear and anxiety. Once this cognitive-emotional link has been made salient, it is equally likely that the evoked emotions influence reappraisals (Lazarus 1999). However, and this is particularly important for the manner of coping, when cognitive and emotional responses diverge then the experiential-emotional system (where fear begins in the amygdala) tends to dominate the cognitive-analytical system and reactions are more likely to be guided by emotion (Loewenstein et al. 2001). The neuroscientist LeDoux has extensively studied these neural pathways and their linkages. In his book “The Emotional Brain (1996, p. 19)”, he points out that “[w]hile conscious control over the emotions is weak, emotions can flood consciousness. This is so because the wiring of the brain at this point in our evolutionary history is such that connections from the emotional systems to the cognitive systems are stronger than connections from the cognitive systems to the emotional systems.” The amygdala evolved before the neocortex and has maintained its hard-wired dominance over cognition in stressful situations because of its ability to rapidly assess threats (as in flight-fright responses; for more explanation see LeDoux 1996). In other words, the fishers’ cognitive-analytical brain is sufficiently aware that there is harm and threat, but their experiential-emotional brain becomes too involved and thus exerts a strong influence on problem-focused coping activity. Simplistically, the fishers feel more and think less, as also indicated by the following interview statement: “No no, I don’t think about climate change because it will be a catastrophe. [...] I’m very afraid of it” (interview, 2015).

In the light of these research results and insights into findings from psychology and neuroscience, it becomes obvious that one crucial mental barrier relevant to climate adaptation is linked to the basic architecture of the human brain and the powerful interplay of weaker cognitions and stronger emotions in the context of troubled person-environment relationships (cf. also Gifford 2013, Marshall 2014). This explains that when the fishers feel concern and fear they are more likely to take action to reduce this unpleasant emotional experience by (unconsciously) choosing primarily coping modes with an emotion-focused function (cf. Section 2.1.2). They feel a lack of control and helplessness, and thus want to protect themselves from facing and approaching the problem through (even more disturbing) offensive and problem-focused coping (e.g. information seeking). They cognitively zone out, try to regulate their emotional response and focus on other things rather than harm and threats related to climate change.

Policy implications

What can be done to reduce the influence of the mental barrier's emotional dominance and enhance more offensive coping? According to the prevailing opinion of the interviewed fishers, much of the media, scientific and policy discourse around Arctic climate change solely highlights losses, costs and severe, uncertain threats. This one-sided perspective fosters and manifests their concern, fear and helplessness, as well as the wish to avoid the topic. In addition, as noted by the interviewees, the media and, in particular, scientists use language heavily steeped in threatening, stressful expressions such as “irreversible”, “worse than previously thought”, “extremely rapid” or “disastrous”. These empirical results are also in entire agreement with emerging studies on climate-change communication and public engagement (cf. e.g. Center for Research on Environmental Decisions 2009, Nisbet 2009). Hence, what is needed is a shift in communication away from fear-mongering narratives and tales of encroaching disaster to a much stronger focus on clear messages, specific policy solutions and positive examples (e.g. recasting the influx of southern fish species as an opportunity to grow the economy). Referring to Lazarus and Folkman's conceptualization of coping and appraisal, it is about changing people's relational meaning of their person-environment relationship. In other words, when climate change and corresponding policy solutions are additionally framed in terms of what can be gained (and not only in terms of what is or will be lost), it might weaken the mental barrier of emotional dominance and related subcortical structures and instead activate people's neocortex. In consequence, people will be more likely to face climate adversity more offensively (cf. also Center for Research on Environmental Decisions 2009). This way of framing, which sets another “train of thought in motion” (Nisbet 2009, p. 15), also corresponds to Lazarus and Folkman's notion of challenge appraisals (cf. Section 2.2.2), which, as opposed to threat, refers to the potential for gain and growth. “The quality of functioning is apt to be better in challenge because the person feels more confident, less emotionally overwhelmed, and more capable of drawing on available resources than the person who is inhibited or blocked.” (ibid. 1984, p. 34).

4.2 Group belonging and cultural cognition

Most of the interviewed fishers were born and raised on the Lofoten Islands. They live in local fishing communities and are, as Jentoft (2000, p. 54) nicely puts it, embedded in “social and cultural systems that give meanings to their lives and directions for their behaviour. Their fishing practices are guided by values, norms and knowledge that are shared within their community”. Within social psychology, it is widely assumed that the individuals' cognitive representation of themselves as a member of a group (e.g. of the Lofoten small-scale coastal fishers) forms an essential basis for intragroup and intergroup relations (Levine 2013). As described by Turner et

al.'s (1987) widely cited self-categorization theory, categorizing the self and others into groups involves a distinction between the group containing the self, ingroup ("us", the coastal fishers), and other groups, outgroups ("them", e.g. the offshore trawler fishers). According to Dovidio et al. (2013), self-categorization is a universal facet of human thinking that makes sense of complex person-environment relationships (like in climate change contexts) and is thus essential for psychological functioning. The ability to sort people into meaningful categories is often automatic and based on similarity, proximity and shared fate (ibid.). My interview results underline this theory. The fishers interviewed proudly perceive themselves as members of the coastal Lofoten fisher group, which is, as they state, known throughout the world for its extraordinary small-scale fishing skills, especially in heavy sea conditions. Evidently, the fishers share common ground (e.g. same skills, expertise and daily routines; use of traditional fishing gear; main income from cod fishery) that constitutes their identification with this ingroup.

Research findings, which are shared across theories from psychology, indicate that the stronger an individual's group identity, the less sharply he or she differentiates between self interest and collective interest (Levine 2013, Smith and Mackie 2007). This includes ways of thinking and behaving that are specific to this group. As a consequence, these individuals become more compliant to group norms, and act in accordance with group-based beliefs, motivations, knowledge, attitudes and goals. Particularly when faced with uncertainty, strongly identified individuals are more likely to turn to similar others, their ingroup, for support and information on what to think, feel and do, which can drive coping activities (Dovidio et al. 2013). The debate on the influence of group norms and values is supported by similar recent research on the theory of "cultural cognition" by Kahan et al. (2011), focusing especially on risk and climate change. The term "cultural cognition" refers to the tendency of people to fit evidence of risk to positions that predominate in groups of those they most strongly identify with. In other words, "individuals are psychologically disposed to believe that behaviour they (and their peers) find honourable is socially beneficial" (ibid. p. 147). Individuals particularly trust those who share similar worldviews and choose to believe in what those around them believe.

This kind of social turning towards one's ingroup can also be observed among the interviewed fishers. They have a strong need to share their concern on climate change impacts with their peers and exchange opinions on what to do (especially with regard to increasing storms). The valued feedback of their peers, in turn, shapes their secondary appraisal of coping options. The fishers' coping behaviour, which can be subsumed under the category of "information seeking", represents both a problem-focused function (managing the problem causing concern) and emotion-focused function (reducing concern and feeling some kind of hope or relief). However, according to the fishers interviewed, the majority of their ingroup members, especially the older ones, continue to hold to the solid group-based value of being a tough fisherman who considers dealing with climate change induced, highly variable weather and fish stocks as a way of life. Thus, as they argue, there is no need to offensively face climate change and anticipatorily cope with threats. The interview data suggest that this strong ingroup belief of invulnerability impedes adaptive climate action on the part of the interviewed fishers. They selectively reappraise the situation to make it reflect a more favourable view of the self and thus fail to perform offensive coping activity.

Obviously, the interviewed fishers adhere to their peer group's values and beliefs that reinforce their connection to their ingroup and identity formation. In accordance with the theory of "cultural cognition" (cf. Kahan et al. 2011), they are motivated to search for information in a biased way in order to avoid dissonance and threats to identity and to protect social standing. They are more

likely to take the position of their trustworthy peers, that is consistent with their cultural predisposition, than to adopt a position inconsistent with it (based on reappraisals they change the relational meaning of their person-environment relationship). This case study illustrates how the complex and intertwined processes of group belonging and cultural cognition have the potential to act as mental barriers that reject sources of information provided by outgroups or non-salient identities (e.g. scientists that predict higher storm frequencies). Taken together, these dynamics help to explain why the interviewed fishers are not encouraged enough to engage more offensively in climate change adaptation. The mental barrier of group belonging and cultural cognition is comparable to invisible defense walls inside the brain that block messages coming from the outside in order to maintain a coherent relational meaning.

Policy implications

According to Kahan et al. (2011), research on how to mitigate the effects of group belonging and cultural cognition is less advanced than research on the mechanisms behind them. Nevertheless, progress has been made in identifying helpful communication techniques. One such technique, as the authors (ibid.) suggest, is identity affirmation. This approach takes into account that identification is not only a source of but also a solution to the problem of climate adaptation. Such a resource-oriented strategy is also considered suitable for the present study context. For example, when presented with scientific climate change information on risks (e.g. increasing storm frequencies due to climate change) that is inconsistent with the fishers' cultural values and beliefs (storms are manageable), the majority of the fishers apparently tend to respond dismissively toward that information. However, when shown that the information (e.g. the fishers' toughness at sea will be increasingly challenged) in fact affirms their values and beliefs, such fishers might be more likely to consider the information open-mindedly. In consequence, and this would represent offensive problem-focused coping, they might discuss more directly with their ingroup members, for instance, how to improve their safety at sea (e.g. by specifically using social media networks as an informal tool for quick weather advice and localized warnings).

Another helpful technique for enhancing engagement could be to give a platform to a representative from the coastal fishers' ingroup who is at the same time a knowledgeable, trustworthy and recognized fisher. Following Kahan et al. (2011), people are less resistant to consider information when they know that an experienced and familiar ingroup member with converging values accepts it. The following interview example might inspire such an approach. An interviewed fisherman in his late fifties has been politically active in the local labor party since 1990 and is a voluntary member of the Norwegian Fishermen's Association (their main focus is to safeguard fishers' best interests). His biggest concern is, as he emphasizes, to raise awareness to the problem of climate change among his fisher colleagues. "I talk about climate change. I am not afraid to talk about it. Maybe I talk too much [laughing], but that's my problem. I want to talk about it and I want people to see it in my way. So that's why I talk about it." (interview, 2015). Other interview partners, both fishers and community representatives who know this fisherman personally, confirm that he has achieved considerable respect and recognition among the coastal fishers over the years due to his profound knowledge and his background as a practicing cod fisher, politician and fishers' lobbyist. This example illustrates that fishers like him could be trustworthy spokespersons, mediating between policymakers, scientists and the Lofoten coastal fishers. A much-needed platform could be provided by engaging him (and his expertise) in scientific research on storm frequency and adaptation and reporting on this collaboration in local media or climate policy recommendations.

5 Conclusions and moving forward

Using Lazarus and Folkman's schematization of coping, appraisal and emotion from psychology as an explanatory point of departure as well as an analytical tool to deepen understanding of the dissonance between widespread concern about climate change and limited offensive coping action, this chapter sheds new light on a newly emerging object of investigation. While acknowledging that there are still crucial controversies, the majority of people worldwide now believe in anthropogenic climate change and, especially due to personal experience, no longer view it as a distant, unreal, impersonal and unimportant phenomenon. In consequence, the predominant academic and political focus on how to mitigate and prevent climate change denial is no longer sufficient. Likewise, it has increasingly become evident that structural barriers alone cannot explain such a dissonance. Instead, it is time to strike out on new paths and explore elusive territory, namely the human brain and the challenging power of its mental barriers. The battle over climate action is – to a significant extent – fought in people's heads.

Following Lazarus (1999, p. 12), “[t]he person and environment interact, but it is the person who appraises what the situation signifies for personal well-being.” Thus, it is indispensable to take into account the cognitive and emotional processes that intervene between the person and his or her environment and constitute the relational meaning of that relationship (i.e. concern about climate change but paralyzed in appropriate action). Considering this crucial issue, the research results and my empirical findings presented in this chapter importantly show that the limited nature of offensive climate action can be seen as having two (intertwined) phases. In the first phase, people appraise harm/loss and/or threat because specific climate-change demands tax or exceed their resources (primary appraisal). Subjective evaluations about what can be done conclude that appropriate coping options are insufficient and coping failure is likely (secondary appraisal). Within this process, the primary appraisal of what is at stake and the secondary appraisal of coping options continuously interact with each other in shaping the degree of impact on well-being and the strength and quality of the emotional reaction (e.g. concern, fear), which, in turn, drive behavioral and intrapsychic coping modes and coping functions (problem- and/or emotion-focused). In this regard, considering solely problem-solving modes of coping is insufficient and narrows the focus to conditions that are appraised as changeable or controllable by action.

In the second phase, however, a variety of mental barriers come into play and interfere with effective climate adaptation, particularly due to the incongruence between primary and secondary appraisals (need of appropriate coping versus inappropriate coping options), which constitutes a pitfall. The examples from neuroscience and social psychology discussed above demonstrate this point. The evolutionary hard-wired dominance of emotion over cognition in the face of threat negatively affects appraisals and, in particular, makes people eager to reduce the unpleasant emotional response of concern (thus defensive emotion-focused coping modes are more likely). Likewise, due to the human desire to belong to a certain ingroup, people feel compelled to take cues for what they should think and do from their ingroup members with whom they strongly identify and share stories. In the above case study, group belonging and cultural cognition function as mental barriers. They “take advantage” of the appraisal incongruence and impede (initial) offensive coping efforts. Influenced by these mental barriers, the interplay of primary and secondary appraisal then reboots and resulting reappraisals lead to climate inaction.

Taken overall however, it is crucial to highlight that without a misbalance between primary and secondary appraisals the impact of mental barriers might be less intense in the second phase. In

particular, the quality of secondary appraisals (“There is something I can do effectively” versus “There is nothing I can do”) is fundamental for emotional response and the initiation of offensive coping action. Against this background, this chapter appeals to policymakers to take this issue into account and frame climate-change communication in such a way that people reappraise their person-environment relationships more positively (e.g. reconsider new coping options which reduces concern and, in turn, the powerful influence of mental barriers). In this regard, it is additionally important to rely on Lazarus and Folkman’s (1984) broad, differentiated and unbiased notion of coping because it is process-related rather than trait-oriented, embraces behavioral *and* cognitive coping modes, deconstructs coping from outcome, and implies a developmental rather than a mastery approach.

Obviously, not only is climate change a very complicated and multifaceted process but people’s relationship with climate change, as both source and victim of its impacts, is equally complex. This leads back to the initial question: Are we sleepwalking into disaster? If the status quo prevails, then the answer has to be yes. However, if we try to understand how neural pathways, emotions and human appraisals work, and thus recognize and avoid their pitfalls, there is a chance of walking fully awake into times of challenge rather than stumbling bleary-eyed towards threatening disasters. Moreover, results from the abovementioned Pew survey indicate that people do support climate policies, which is a hopeful piece of information. Even with our limitations, humans have immense capacity for critically reflecting upon their person-environment relationship and taking action. Yet, knowing what the barriers are and deciding what to do about them are two very different things. Climate information alone will not sway people. Instead, the key is to use communication strategies that reduce the likelihood that people appraise climate change as threatening, for example by framing climate change as a challenge or in a manner that does not threaten people’s values and group identity. To sum up, there cannot be a magic bullet in climate communication due to complex local specifics. However, basic principles can guide policymakers and academics. There is hope, especially when scientists from different disciplines, policymakers and citizens as local experts meet as equals and collaborate. In this sense, quoting Lazarus (1998, p. 404.), “I would like to believe I have thrown some useful light on the never-ending effort to understand”.

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