Mindsets for Sustainability: Exploring the Link Between Mindfulness and Sustainable Climate Adaptation

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Christine Wamsler⁎, Ebba Brinka

Abstract

Growing globalisation and climate change are challenging the sustainability of our societies. It is now clear that climate change and its devastating impacts cannot be resolved by new technology or governance alone. They require a broader, cultural shift. As a result, the role of human beings’ ‘inner dimensions’ and related transformations is attracting increased attention from researchers. Recent advances in neuroscience suggest for instance that mindfulness can open new pathways towards sustainability. However, the role of mindfulness in climate adaptation has been largely ignored. This paper is the first exploratory empirical investigation into linking individuals’ intrinsic mindfulness (as opposed to outside mindfulness interventions) to pro- and reactive climate adaptation. Based on a survey of citizens at risk from severe climate events, we explore if, and how individual mindfulness is correlated with climate adaptation at different scales. The results show that individual mindfulness coincides with higher motivation to take climate adaptation actions or to support them, especially actions that are ‘other-focused’ or support pro-environmental behaviour. Mindfulness may also corroborate the acknowledgement of climate change and associated risk perception, and it may steer people away from fatalistic attitudes. We conclude with a call for more research into the relationship between human beings’ inner dimensions and climate adaptation in the wider public domain.

1. Introduction

Current development patterns, marked by growing globalisation, unsustainable consumption, and inequalities, are producing increasingly risky and unsustainable conditions for our society (IPCC, 2014; Kates et al., 2001; Ravworth, 2012). In 2017, a string of unusually powerful hurricanes accompanied by flooding and storm surges hit the Caribbean and the United States, supporting climate scientists who state that “climate change is already with us” (Sneed, 2017).

Scholars, thus, increasingly argue that complex global sustainability challenges, such as responding to climate change and its devastating impacts, cannot be resolved by new technology or governance alone. They also require a broader, cultural shift towards sustainability (Edwards, 2015; Esbjörn-Hargens and Zimmermann, 2009; Dhiman and Marques, 2016; O’Brien and Hochacha, 2011; O’Brien and Selboe, 2015; Parodi and Tamm, 2018).

In the search for new approaches, examining human beings’ ‘interiority’ or ‘inner dimensions’ is attracting increased attention (Buchanan and Kern, 2017; Hedlund-de Witt, 2012; O’Brien and Hochacha, 2011). Inner dimensions, as used here, refer to subjective domains within the individual relating to people’s mindsets, worldviews, beliefs, values and emotions. In climate adaptation, which is “the process of [societal] adjustment to actual or expected climate and its effects” (IPCC, 2014: 1758), such dimensions have, to date, been largely overlooked (O’Brien and Selboe, 2015; O’Brien and Hochacha, 2011; Wamsler et al., 2017; Wamsler, 2018). In cognate fields, however, research on inner dimensions, transformation and associated features, such as mindfulness, is gaining increasing momentum.

In fact, recent advances in neuroscience and neuroplasticity (Doty, 2016; Goleman and Davidson, 2017; Lazar et al., 2005; Luders et al., 2009) are opening new avenues to consider how human beings can deal with the climate crisis. Neuroplasticity refers to the brain’s lifelong ability to reorganise itself by forming new neural connections. It allows the neurons (nerve cells) in the brain to adjust in response to learning and practices, such as mindfulness meditation (cf. Goleman and Davidson, 2017). The associated changes in neural profile can, among other things, impact people’s readiness for action and helping others (Goleman and Davidson, 2017).

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⁎⁎ Inner transformation describes changes in the sphere of inner human dimensions/interiority and relates to all kinds of activities that can support such changes. They involve changes in people’s consciousness and can be related to mental, religious and indigenous practices/knowledge, such as mindfulness.

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group comparison (Glaser and Strauss, 1967; Marris et al., 1998). The response rate was 36% (n = 217). There was a 3:2 ratio of men to women among the respondents.

In the survey, individual mindfulness disposition was assessed by four questions, adapted from the Five-Facet Mindfulness Questionnaire (FFMQ) (Baer et al., 2006). The FFMQ is a 39-item standardised instrument based on a 5-point Likert scale that measures mindfulness across five dimensions:

- observing (e.g., “I pay attention to how my emotions affect my thoughts and behaviour”),
- non-reacting (e.g., “When I have distressing thoughts or images, I ‘step back’ and am aware of the thought or image without getting taken over by it”),
- non-judging (e.g., “I criticize myself for having irrational or inappropriate emotions” [reversed scale]),
- acting with awareness (e.g., “It seems I am ‘running on automatic’ without much awareness of what I’m doing” [reversed scale]), and
- describing (e.g., “I’m good at finding words to describe my feelings”).

The selected mindfulness items had been tested and adapted for Swedish audiences (FFMQ_SWE; Lilja, 2009). To fit the adaptation context of our survey, respondents were asked to answer the mindfulness questions in relation to climate change, preventive actions or in general (see Table S1 in the Supplementary material). An overall mindfulness index was created from the respondents’ rating of the first four dimensions/items. The ‘describing’ dimension/item had to be deleted to avoid repetition and respondent fatigue.

The mindfulness dimensions and index were then assessed in relation to the other survey questions, which asked about respondents’ attitudes and practices for sustainable climate adaptation, and environmental issues in general (Table S1 in the Supplementary material). Sustainable climate adaptation is here understood as individual and collective processes and actions that enable people to cope better with climate impacts, by reducing negative effects on wellbeing and the disruption of key natural resource flows for present and future generations (cf. Eriksen et al., 2011; Tompkins and Eakin, 2012; McNeeley, 2012). The concept recognises that not every adaptation to climate change is a good one, and there is the need to distinguish between desirable and undesirable adaptation processes (Eriksen and O’Brien, 2007). Accordingly, sustainable climate adaptation practices depend on the (level of) inclusiveness and flexibility of the combined set of adaptation measures employed (rather than the effectiveness of a single measure) and how they are linked to institutional support and structures for adaptation mainstreaming (Wamsler and Brink, 2014a, 2014b; Wamsler and Pauleit, 2016). Inclusiveness refers here to the inclusion of measures taken to address all types of risk factors (i.e., hazards, vulnerability, lack of response capacity and lack of recovery capacity (Wamsler and Brink, 2014a)). Flexibility relates to the number and diversity of activities implemented for each type of measure (e.g., including economic, social, physical/technical and ecosystem/nature-based activities (Wamsler and Brink, 2014a)).

A quantitative measure of the level/diversity of adaptation activity was thus created based on a checklist of 14 common household adaptation actions (Wamsler and Brink, 2014a, 2014b) and a free-text option. The listed measures included both proactive and reactive actions and related to economic (e.g., home insurance), social (e.g., warning neighbours), physical (e.g., adapting the house to withstand extreme weather), and ecosystem-based (e.g., use plants to create a more comfortable climate) actions to address different risk factors. Next,

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2 The survey was accompanied by a letter, which also included a link to a general description of the larger research project.

3 For further explorations, theoretical assumptions, and hypotheses on the potential connection between the two subjects of investigation (i.e., mindfulness and sustainable climate adaptation) that underpin this study see Wamsler (2018).
residents were asked to rate, on a 5-point Likert scale, the extent to which they were motivated to act or support action related to climate adaptation in nine different circumstances, including the adaptation action’s ability to generate economic benefits (e.g., low cost), social benefits (e.g., reduce others’ risk), or ecological benefits (e.g., contributing to mitigation of greenhouse gases). Four indices were created from the nine motivation items: economic motivation (two items), social motivation (three items), ecological motivation (two items), and overall motivation (all nine items) (see Table S1 in the Supplementary material).

To detect the general level of engagement in climate or environmental issues, including linkages to institutional support structures and potential climate change denial, respondents were asked to what extent they kept a vegetarian diet, if they were a (passive or active) member of any environmental or risk organisation, if they had experienced ‘climate anxiety’, and whether they thought that the climate change issue had been exaggerated. Regarding the latter, we also intended to assess fatalist attitudes according to Cultural Theory of Risk (Douglas and Wildavsky, 1982; Thompson et al., 1990) using the proxy statements “The future is too uncertain for a person to make serious plans” and “It feels pointless for me to take climate action if no one else does” (cf. Morris et al., 1998). In Cultural Theory of Risk, ‘fatalistic’ behaviour is a ‘non-strategy’ for survival based on the idea that taking or not taking adaptation action has the same (negative) result (Thompson et al., 1990). For a complete listing of the survey questions used in this study, see Table S1 in the Supplementary material.

SPSS Statistics software was used to analyse the data and calculate correlations (Spearman’s rho) between mindfulness and the other variables. The mindfulness and motivation indices were tested for reliability using Cronbach’s Alpha; for which a score above 0.700 indicates a ‘good’ index (that the items included in the index are dimensions of the same phenomenon). The score for the motivation index was 0.802, while the mindfulness index was 0.802, indicating negative average covariance among items. Methodological implications and considerations for follow-up studies are presented in Section 4.

3. Results

The results of this exploratory study show that individuals’ mindfulness disposition correlates with their response to severe climate events, recovery, and proactive climate adaptation, especially as regards social dimensions of adaptation. In fact, our survey respondents who scored highly on the mindfulness questions were more likely to report:

- higher overall motivation for taking (or supporting) climate adaptation actions;
- being motivated by social factors to take adaptation action (i.e., being encouraged by friends and family, reducing the risk for others, and having a ‘good conscience’);
- having taken social (‘other-focused’) adaptation measures that require community interaction (here, warning neighbours about hazard events);
- belief in (correct representation of) climate change;
- general pro-environmental behaviour (here, being a vegetarian); and
- non-fatalist attitudes.

More specifically, a high mindfulness score was found to be positively correlated with a high score for overall motivation for climate adaptation ($r = 0.261, p \leq .001^*$). This was the strongest and most significant finding (Table 1).

In addition, the survey showed linkages between mindfulness and ‘other-focused’ social factors. In fact, it showed a positive correlation ($r = 0.178, p \leq .01$) between mindfulness disposition and being motivated by social factors to take adaptation action (i.e., being encouraged by friends and family, reducing the risk for others, and having a ‘good conscience’). Among the respondents who scored highly on mindfulness, justice-based arguments for adaptation action thus seem to resonate more. On the contrary, scoring highly on economic and ecological motivation could not be independently linked to mindfulness disposition.

While the number/diversity of adaptation actions taken was not correlated to mindfulness, a positive correlation was found between a mindfulness disposition and one particular adaptation action, namely, warning neighbours about a storm ($r = 0.141, p \leq .05$). No other correlations were found for reported adaptation actions, either individually or by grouping according to themes (e.g., physical/technical, social and ecosystem/nature-based). In addition, the second other-focused adaptation measure in the checklist (checking on elderly relatives/neighbours during a heatwave) was not found correlated with mindfulness. However, other studies in the region suggest that heatwaves have not (yet) had much impact or gained similar attention as floods and storms in the community concerned (Wamsler and Brink, 2014b).

Regarding general environmental attitudes and behaviour, the more mindful respondents were found less likely to deny climate change by stating that climate danger is exaggerated ($r = -0.172, p \leq .05$). In addition, a positive correlation was found between mindfulness and being a vegetarian ($r = 0.139, p \leq .05$). No correlation was found

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*Correlation is significant at the 95% level (2-tailed).

**Correlation is significant at the 99% level (2-tailed).
between mindfulness and feeling ‘climate anxiety’, or the engagement in organisations, associations or groups focusing on environmental or risk issues.

Finally, we assessed mindfulness disposition against fatalist attitudes such as finding individual climate-action ‘pointless’ and the future too uncertain to make serious plans. There was no link with overall mindfulness; however, we identified negative correlations between fatalism and two particular dimensions of mindfulness, namely non-judging (\( r = -0.218, p \leq 0.01 \)) and acting with awareness (\( r = -0.166, p \leq 0.05 \)) (Table 2). This is to say, respondents who agreed with the statements “I criticize myself for having irrational or inappropriate emotions” and “When under pressure, it seems I am ‘running on automatic’ without much awareness of what I’m doing” were more likely to also display fatalist attitudes. Fatalism was also correlated with the feeling that climate danger was exaggerated (\( r = 0.255, p \leq 0.001 \)). Regarding socioeconomic (and potentially confounding) factors, mindfulness disposition was found (positively) correlated to income (\( r = 0.204, p \leq 0.01 \)), but not to gender.

### 4. Discussion

While, in general, mindfulness research is rapidly growing (AMRA, 2016), with a 30% annual increase (Ericson et al., 2014), there is a clear lack of scientific research on mindfulness in climate adaptation (Wamsler et al., 2017). At the same time, new scientific domains are opening up in cognate fields that implicitly address fragments of the mindfulness–adaptation nexus. These lie at the interface between, for instance, wellbeing, environment, disaster, and organisation research (Wamsler, 2018). Most of these studies focus on certain attributes of mindfulness, such as emotions and compassion (e.g., Roese, 2012; Lu and Schuldt, 2016; Smith and Leiserowitz, 2014), and only few look at mindfulness as a whole (e.g., Ericson et al., 2014; Panno et al., 2015, 2017).

Our study thus complements current research by explicitly assessing the potential role of mindfulness in climate adaptation, and by providing empirical evidence of the correlation between individual mindfulness disposition and larger-scale changes that can support sustainable climate adaptation (attitudes and practices). In fact, our results indicate that individual mindfulness coincides with increased motivation to take (or support) climate adaptation actions, which might be linked to the increased acknowledgement (or an adequate representation) of climate change that was identified. It may also be associated with the influence of mindfulness in supporting compassionate or hopeful attitudes that could steer people away from fatalist behaviour, and translate into the identified increase in actions that are social, ‘other-focused’ (pro-social behaviour), or pro-environmental in nature. This is consistent with other research that has linked mindfulness to the cultivation of compassion and intrinsic core values which, in turn, are assumed to be reflected in actions for the common good (Brown and Kasser, 2005; Ericson et al., 2014; Hanh and Weisman, 2008; Kaza, 2008). Accordingly, Lu and Schuldt (2016) show that higher levels of compassion are consistent with a stronger belief that climate change is caused by human activities, which mediates increased policy support. Similarly, Dickinson et al. (2016) and Pfattheicher et al. (2016) demonstrate that compassion is positively correlated with pro-environmental values and behaviours that can translate into increased policy support, for example, in the form of donations to environmental organisations. Panno et al. (2015, 2017) have recently advanced similar ideas, arguing that attention and awareness facets of mindfulness influence the cognitive reappraisal of emotion (i.e., emotion-regulation) which in turn positively influences both acknowledgment of climate change and subsequent pro-environmental behaviour. The theoretical account is that “people’s cognitive reappraisal determines how individuals appraise climate change-related stimuli (e.g., a rise in temperature, a change in weather patterns, and emotions concerning these phenomena) and the type of goals they pursue (e.g., reducing their ecological footprint)” (Panno et al., 2015: 59). The identified positive correlation between mindfulness and being a vegetarian found in our survey supports such findings. It also indicates the potential significance of mindfulness in addressing the causes of climate change, since meat reduction is increasingly seen as one of the most effective climate mitigation strategies (De Boer et al., 2016; Wynes and Nicholas, 2017).

Overall, the links identified between mindfulness, pro-environmental behaviour and adaptation complement results from new domains that lie at the interface between environmental and wellbeing research, which have emerged in recent years. For instance, while most environmental studies focus on objective interactions between natural, social, and human systems and tend to ignore subjective human aspects (Sumi, 2007), an increasing number of studies at the environment–wellbeing interface have provided support for the influence of mindfulness on issues such as: i) human-nature connectedness (Amel et al., 2009; Anthony, 2013; Howell et al., 2011; Lockhart, 2011); ii) compassion for the environment (Pfattheicher et al., 2016; Bai, 2013); iii) pro-environmental values, intentions and engagement (Amel et al., 2009; Brown and Kasser, 2005; Ericson et al., 2014; Jacob et al., 2009; Pfattheicher et al., 2016; Siqueira and Pitassi, 2016); and iv) sustainability-oriented lifestyles and innovations (Amel et al., 2009; Brown and Kasser, 2005; Brown and Ryan, 2003; Brown et al., 2004, 2007; Ericson et al., 2014; Goleman, 2009; Jacob et al., 2009; Sheth et al., 2010; Siqueira and Pitassi, 2016; Lengyel, 2015). Accordingly, individual mindfulness might also help overcome key psychological barriers that are said to limit climate adaptation, such as certain ideological worldviews, risk perceptions, and compassion fade that may hinder the collective ability and willingness to confront major environmental challenges (Gifford, 2011; Markowitz et al., 2013). In this context, the indication that mindfulness might steer people away from fatalist attitudes resonates with environmental studies that have shown how compassion fade is negatively correlated with pro-environmental

<table>
<thead>
<tr>
<th>Mindfulness disposition (4-item index)</th>
<th>Fatalist (2-item index)</th>
<th>Correlation coefficient</th>
<th>Significance (2-tailed) N</th>
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<tr>
<td>0.016 [**]</td>
<td>-0.134</td>
<td>0.052</td>
<td>212</td>
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<tr>
<td>0.005</td>
<td>0.945</td>
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<td>0.802</td>
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<tr>
<td>-0.218 [**]</td>
<td>0.002</td>
<td>208</td>
<td></td>
</tr>
<tr>
<td>-0.166 [**]</td>
<td>0.017</td>
<td>206</td>
<td></td>
</tr>
</tbody>
</table>

* Correlation is significant at the 95% level (2-tailed).
** Correlation is significant at the 99% level (2-tailed).
values and behaviours (Markowitz et al., 2013). Compassion fade reduces environmental identity and is a significant psychological barrier to building broad public support for addressing environmental problems, including climate change (Markowitz et al., 2013). Nevertheless, to date, the psychological aspects of climate change and adaptation have barely hit the radar of climate change science.

In addition, our finding that individual mindfulness is correlated with social factors, in terms of being both a driving force and a focus of action-taking, resonates with recent social neuroscience research (cf. Valk et al., 2017a, 2017b). It also provides support for research indicating that mindfulness can sensitize people politically to the consequences of unquestioned structures and power relations at all scales (Dayley, 2017; Senghaas-Knobloch, 2014; Rowe, 2017; Wamsler et al., 2017).

Taken together, our results indicate the potential links between individual mindfulness and: i) cognitive/subjective (‘inner’ to the individual), ii) behavioural (‘outer’ to the individual), iii) cultural (‘inner’ to society) and iv) systems changes (‘outer’ to society) that are required for sustainable climate adaptation (cf. O’Brien and Hochachka, 2011). First, they show a potential relation between mindfulness and personal adaptation, which fosters the capacity to shift from passive/fatalist behaviour to (a motivation for) active engagement. Second, they indicate the potential of mindfulness to influence behavioural adaptation that enhances the capacity of individuals to employ practices that support sustainable adaptation (e.g., pro-environmental behaviour). Finally, changes in cultural and systemic adaptation could be identified in relation to people’s perceptions of climate change and the involvement of interpersonal and social capacity to address risk at different scales.

However, there are certain limitations, which require follow-up. While this study provides important new insights, it was limited in breadth (number of participants, context) and depth (four dimensions/questions of mindfulness disposition). Follow-up research should thus possibly include more items—ideally all 39 items and five dimensions of the FFMQ—to assess mindfulness disposition more deeply, and make the mindfulness index more reliable (cf. Section 2). Some respondents might have been discontented being asked to answer questions about their feelings in a survey on climate adaptation which may have led to negative responses. Adding more survey questions and information is, however, challenging when assessing mindfulness in relation to another (abstract and understudied) topic, as it can lead to respondent fatigue and abandon.

Further research should look into how mindfulness, and inner dimensions generally, correlate with different aspects relating to sustainable climate adaptation across different socio-cultural contexts. The latter, such as the relatively low level of climate scepticism in Sweden (Tranter and Booth, 2015), may have implications that could be assessed through comparative studies. Comparative studies are also crucial to understanding which context or preconditions could best support individual mindfulness and/or bring about sustainable climate adaptation.

Finally, further research is needed to follow up on the identified correlations to depict potential causations, for instance in relation to certain worldviews. Underpinned by theoretical assumptions and testable hypotheses, it should explore the influence of mindfulness on ontological, epistemological, axiological, anthropological and societal aspects, and associated worldviews (e.g., traditional, modern, post-modern, and integrative), which have been linked differently to sustainable behaviour and concern about climate change (Hedlund-de Witt, 2011, 2012; De Witt et al., 2016; Manuel-Naverrete et al., 2004). These perspectives encompass human–nature interconnections, as well as what we consider to be valid knowledge, a ‘good life’, our ‘life-task’ and the best possible ways to address societal problems (Hedlund-de Witt, 2012), all of which influences sustainable climate adaptation.

5. Conclusions

Due to the increasing number of climate hazards and disasters, humanity faces ever more complex challenges. With current approaches to climate adaptation being unable to address them, new narratives and social practices are needed to encourage a broader shift towards sustainability.

Recent advances in neuroscience and other fields suggest that mindfulness can open new pathways towards sustainability. Nevertheless, the potential role of mindfulness in climate adaptation has, to date, been largely ignored, and related empirical studies hardly exist.

Our study addresses this gap; it is unique in that it presents empirical evidence on the correlation between people’s mindfulness disposition (as opposed to impacts of mindfulness interventions) and climate adaptation. It responds to the urgent call for increased focus on interiority and greater attention to mindsets, awareness, and motivation in adaptation research.

Based on a survey of citizens at risk of severe climate events, we argue that individual mindfulness may be able to facilitate sustainable climate adaptation. Follow-up studies are required to further explore the identified correlations and what they may (or may not) mean for supporting attitudes and practices for sustainable climate adaptation.

Our results indicate that mindfulness of individual agents is socially relevant and linked to sustainable climate adaptation at different scales. It is correlated to motivation to take or support climate adaptation actions. It may translate into increased action-taking especially for measures that are ‘other-focused’ and/or support pro-environmental behaviour. In addition, it may corroborate the belief in (correct representation of) climate change, associated risk perception, and steer people away from fatalist behaviour. Therefore, it could positively influence collective social action, for instance as part of collaborative climate adaptation governance and planning, and should thus be considered in related policy and action. These outcomes have important policy implications and respond to the call in the latest IPCC Assessment Report and the commitments of the Paris Climate Agreement to address behavioural change in order to accelerate social transformation (Kolstad et al., 2014; Stern et al., 2016).

We conclude that mindfulness—as an individual trait and possibly a practice or state—has the potential to open new pathways towards sustainable climate adaptation, which require further exploration, and thus call for increased research on inner dimensions (or interiority) to support inner-outer transformation. In this context, quantitative and qualitative follow-up investigations are required to assess the influences of mindfulness disposition, how it is linked to people’s mindsets or worldviews, and how it could be supported, in order to make decision-makers and citizens more proficient at perceiving and acting on climate and disaster risk. This includes the creation and assessment of targeted tools and pre- or co-conditions in different (cultural) contexts that can allow for individual mindfulness to bring about societal transformation and adaptation.

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