



How Does Mindfulness Affect Pro-environmental Behaviors? A Qualitative Analysis of the Mechanisms of Change in a Sample of Active Practitioners

Ute B. Thiermann¹ · William R. Sheate¹

Accepted: 3 October 2022
© Crown 2022

Abstract

Objectives While there is theoretical and empirical evidence for a positive relationship between mindfulness and pro-environmental behaviors, so far research into mindfulness-based sustainability trainings with meditation novices yielded underwhelming results. At the same time, there is a lack of qualitative research into the mindfulness and sustainability nexus. The objective of this qualitative research was to study the potential mechanisms linking mindfulness practices and individual engagement in pro-environmental behaviors in a sample of meditators.

Methods This research is based on a reflexive thematic analysis of 13 semi-structured interviews with active meditators, analyzed under a constructivist epistemology and experiential orientation to data interpretation.

Results Five themes describe the mindfulness-induced behavior changes experienced by the interviewees: awakening of the mind (self-regulation), awakening of the heart (relational capacities), internalizing environmental motivation, eudaimonic well-being, and deepening mindfulness. A thematic map displays the multitude of factors mediating the process of change.

Conclusions This study revealed that for those interviewed, the degree to which mindfulness practices can encourage pro-environmental behaviors depends on the level of individual commitment towards mindfulness as a lifestyle. Particularly, the integration of mindful living principles in form of the informal practice of mindfulness plays a key role to implement behavior change. Yet even though this research identified five positive factors for change, the specific context of the interviewee sample combined with general methodological drawbacks call for a careful interpretation of the results regarding its applicability to the general population. Overall, this research provides valuable insights into the mindfulness-sustainability nexus and shows the potential of qualitative methods to research complex intra-individual change processes and long-term behavior change.

Keywords Mindfulness · Compassion · Informal mindfulness · Sustainability · Pro-environmental behaviors · Motivation

Science shows that to prevent the worst of climate change, individuals need to actively change many of their day-to-day behaviors, which involves far-reaching changes to their diets, energy usage, and transport (Babiker false 2018). Therefore, environmental psychologists are paying increasing attention to the ways in which pro-environmental behaviors (PEB), defined as “behavior(s) that consciously seek to minimize the negative impact of one’s actions on the natural and built world” (Kollmuss and Agyeman 2002, p. 240), could be promoted widely (Gatersleben 2018, p. 158). In a 2-pathway

model for PEB, Thiermann and Sheate (2020a) outlined theoretical arguments why, contrary to the dominant perspective, normative reasoning might not be sufficient to motivate PEB and that a relational pathway could potentially play an important role in building and maintaining PEB. Based on these assumptions, it can be argued that a promising way to reinforce PEB is the implementation of “experiential strategies,” defined as “interventions which aim to physically, cognitively, and affectively stimulate meaningful experiences in relation to oneself, others and nature” (Thiermann and Sheate 2020a, p. 7).

Over the past 30 years, researchers have increasingly studied whether mindfulness plays a role in the degree to which people actively engage in PEB. Much of this research focused on documenting the positive relationship between trait mindfulness and PEB (Thiermann and Sheate 2020b).

✉ Ute B. Thiermann
ute.thiermann15@imperial.ac.uk

¹ Imperial College London, Centre for Environmental Policy,
Imperial College London, 16-18 Prince’s Gardens, Weeks
Building, London SW7 1NE, UK

For example, studies showed that those with higher levels of trait mindfulness tend to consume more sustainably (Dhandra 2019; Fischer false 2017), eat less meat (Hunecke and Richter 2019; Werner false 2020), and more often take part in environmental activism (Wamsler and Brink 2018). Some researchers also found that individuals who follow an active mindfulness practice, such as meditation or other mind-body exercises, perform more PEB (Jacob et al. 2009; Loy and Reese 2019; Panno false 2018) and have a lower environmental impact associated with their diet (Thiermann false 2020).

Given that mindfulness training has been shown to increase trait mindfulness in individuals, researchers began studying if mindfulness-based programs could be used to improve PEB performance. First research regarding a specialized 8-week program, blending environmental education and meditation training, did not show significant changes in quantitative PEB measures (Böhme false 2018; Geiger false 2019a; Stanzus false 2019). Yet another lab experiment revealed that a group of individuals opted for more sustainable product choices after a brief mindfulness exercise (Chan 2019). This inconsistency in findings indicates that more research is needed to understand the link between mindfulness and PEB, and the potential of using mindfulness training to promote behavior change. As of now, researchers hypothesize that mindfulness-induced improvements in PEB evolve over a longer period and take at least 1 year of regular practice (Geiger false 2019b; Thiermann false 2020). They also suggest that this might happen as a result of intermediate changes in individuals' self-regulation, pro-sociality, feelings of connectedness with nature, materialism, intrinsic values, subjective well-being, and health-related behavior changes (Thiermann and Sheate 2020a).

Yet even though qualitative studies could provide insights into such pre-behavioral indicators, very few qualitative studies of the mindfulness-sustainability nexus exist. This corresponds with the general trend in mindfulness research, where in 2019, qualitative studies accounted for less than 10% of peer-reviewed publications (Frank and Marken 2021). The few qualitative studies relating to mindfulness and PEB so far have focused on the effect of short-term mindfulness interventions on consumption behaviors in meditation-naïve participants, in the therapeutic realm (Armstrong 2012), or in a mixed-methods context of the above-mentioned 8-week blended program (Frank false 2019; Frank false 2021). Again, the results of these qualitative studies are inconclusive, with mindfulness having improved some of the participants' core competences for sustainability as well as their ability to introspectively work with emotional states linked to consumption behavior. However, rarely this translated into the desired changes in PEB. Quite the contrary, Frank et al. (Frank false 2021) reported several counter cases, where mindfulness practice reinforced self-confirmative reasons to not consume sustainably. Finally, one mixed-methods study found that combining mindfulness with outdoor tourism made participants more ready to preserve nature (Deringer false 2020).

It remains controversial if and to what extent mindfulness can help change PEB. Due to the challenge of comprehensively assessing behavioral change processes with quantitative methods, this research aimed to use qualitative methods to inquire about the pro-environmental motivations and behaviors of individuals with an on-going meditation practice for a year or more. The analysis was guided by the following research question: Have the study participants experienced changes in their motivations and performance levels of PEB after they started engaging in mindfulness practices, and if so, what are the common mechanisms mediating these changes?

Methods

Participants

This qualitative study is a follow-up to an online survey we carried out with a non-representative sample of 300 individuals with varying meditation experiences in the UK (Thiermann false 2020). The cross-sectional study, built mostly on psychometric scales and frequency indicators, showed that the pro-environmental motivations and the diet-related environmental impact improved for groups of individuals with increasing levels of meditation experience. The survey, advertised as a study relating to “personal and planetary well-being and mindfulness,” was distributed in the year 2018 via social-media and meditation-related newsletters; one-third of the responses was acquired on the MTurk crowdsourcing marketplace. To deepen insights into the differences in motivations and PEB of participants, we invited volunteers with meditation experience to participate in interviews for this qualitative study 1 year after the survey was closed.

The main sampling criteria aimed at finding diversity in several aspects: the degree of meditation experience and on-going practice, the level (high, medium, low) and type (meat eater, pescatarian, vegetarian, vegan) of animal-protein consumption pattern as an approximate indicator for their commitment to PEB. The sample also should be diverse in population parameters such as income, gender, age, and education. The final sample counted 13 mindfulness practitioners from a mixture of secular, yogic, and Buddhist backgrounds. As shown in Table 1, the study sample is diverse regarding gender, income, education, and age. It includes practitioners with as little as 36 lifetime hours of formal meditation and as much as over 2500 h. There are examples of individuals with high meditation hours who are meat eaters as well as vegans. The same is true for those on the lower range of formal meditation experience. The interviewees also show the full range of carbon emissions associated with their animal-protein diet (which could range from zero to 90 CO₂eq/month), without a clear pattern regarding their meditation hours.

Table 1 Interviewee data collected during quantitative survey in 2018, 1 year prior to the interviews (Thiermann et al., 2020). List of PEB collected during interviews

Pseudonym	Gender	Age	Education	Income	Meditation hours		CO ₂ eq/ month related to animal- protein diet	PEB
					monthly	lifetime		
Cameron	Male	55–64	BA/MA	>100K	12	1872	58.4	Low general consumption, reduce meat consumption, organic gardening, public transport, reduce packaging
Daria	Female	35–44	BA/MA	<20K	5	168	16.6	Buy organic/fair-trade/high-welfare, vegetarian diet, buy local, composting, pick-up waste, recycling, reusable containers, energy efficiency, walking/cycling, public transport, educating others, volunteering
Hanna	Female	35–44	A-Levels	<20K	12	432	7.1	Buy organic/fair-trade/high-welfare, mostly vegan diet, low consumption, recycling, public transport, walking/cycling
Heather	Female	65–74	BA/MA	51–100K	16	1536	48.8	Low general consumption, buy organic/fair-trade/high-welfare, reduced meat and no dairy consumption, avoid flying, public transport, biodiversity gardening, recycling, wildlife watching, donations to NGOs
Jina	Female	45–54	PhD	51–100K	1	36	46.5	Buy organic/fair-trade/high-welfare, reduce meat consumption, food growing, green consumer, buy local, reduce packaging, bulk shopping, reusable containers, pick-up waste, avoid flying, energy efficiency, volunteering, wildlife watching, donations to NGOs, environmental activism
Judith	Female	25–34	BA/MA	21–50K	12	432	7.1	Buy organic/fair-trade/high-welfare, vegetarian diet, buy local, green consumer, reduce packaging, recycling, reusable containers, walking/cycling, public transport, educating others, volunteering, environmental activism
Karen	Female	45–54	BA/MA	51–100K	2	324	0.0	Recycling, reusable containers, vegan diet, avoids flying and pays for carbon offsetting, public transport
Martin	Male	45–54	GCSE	21–50K	24	864	70.6	Recycling, public transport, vegan in phases
Marcus	Male	35–44	BA/MA	51–100K	12	1152	22.5	Buy organic/fair-trade/high-welfare, pescatarian diet, buy local, green consumer, composting, walking/cycling, avoid flying
Sabine	Female	45–54	BA/MA	<20K	16	2496	16.7	Low consumption, buy organic/fair-trade/high-welfare, vegetarian (increasingly vegan) diet, buy local, bulk shopping, food growing, green consumer, reduce packaging, energy efficiency, avoid flying, walking/cycling, public transport, environmental activism
Teresa	Female	45–54	BA/MA	<20K	16	576	46.6	Buy organic/fair-trade/high-welfare, buy local, green consumer, recycling, reduce packaging, energy efficiency/residential solar energy, educate others, volunteering, donations for NGOs, environmental activism
Travis	Male	45–54	BA/MA	51–100K	4	168	48.0	Buy organic/fair-trade/high-welfare, reduce meat consumption, buy local, reduce food waste, recycling, reusable containers
Will	Male	55–64	GCSE	<20K	12	2592	0.0	Recycling, reduce packaging, vegan diet, energy efficiency at home, walking/cycling, public transport, biodiversity gardening

Table 1 summarizes the descriptive data collected from the respondents during the survey, as well as a list of all PEB they reported during the qualitative interviews. All interviewees received pseudonyms for ease of analysis and writing, and to ensure confidentiality and anonymity. There was no remuneration for the interviews.

Procedures

Our choice of qualitative method was guided by the nature of the research question, as well as the limited size of the research team. Because the research goal was to better understand the (potential) mechanisms of change between

mindfulness practice and PEB, the creation of themes helped the identification of the commonalities between the experiences of all participants. At the same time, because we intended to shed light on the personal experiences and motivations of the participant sample regarding the preceding quantitative study and theoretical work, we favored a flexible, experiential, and interpretative approach.

Reflexive TA, as first formalized and then further developed by Braun and Clarke (2006), delivers on all of these objectives. Reflexive TA is theoretically flexible, but not atheoretical and purely descriptive such as qualitative content analysis. While emphasizing researcher subjectivity and interpretation, the main goal of reflexive TA is to identify patterns in the data and create themes that respond to the specific research question. A disadvantage of reflexive TA is that as the procedures are simpler and faster than other interpretative approaches, it might therefore lose some of the idiographic depth an interpretative phenomenological analysis could provide, and lack the theory-building potential of grounded theory (Braun and Clarke 2021a). To counteract some of these drawbacks, we reinforced the idiographic perspective by capturing all factors for change that have been named by the participants in a thematic map. In regard to the theoretical gap, we acknowledge that our interpretation of the data has emerged under consideration of our prior empirical and theoretical work (Thiermann and Sheate 2020a; Thiermann false 2020).

In this case of reflexive TA, we worked under the epistemological paradigm of constructivism which assumes a bidirectional understanding of the relationship between language and experience, and language becomes implicit in the reproduction of both meaning and experience (Byrne 2021). For our analysis, this means that we did not only look for recurring information from the interviewees, but also gave space to the interpretation of what is meaningful to our research question and analysis. We further implemented an experiential orientation for understanding the data, which aims to “give voice” (Braun false 2022) to the participants and analyze their subjective viewpoints in an “empathic” way (Braun and Clarke 2021b). This means that we applied a reflective view on language and focused on the personal understanding and lived experiences of the respondents, and how they make meaning of their experiences.

We used a semi-structured interview design and sequenced questions with the intention to avoid priming the PEB-related responses towards a deliberate mindfulness angle. The questionnaire started by inquiring about dietary habits and PEB, then explored general well-being management strategies and mindfulness practice routines, and only the last block of questions explicitly explored the relationships participants may have observed between their mindfulness practice and their performance in PEB. Participants also were invited to provide any additional comments at the

end of the interview (see Appendix for all questions). Most volunteers were interviewed online via Zoom, with an average duration of 1 h. All interviews were audio-recorded with the permission of the interviewees and later transcribed verbatim in an orthographic manner (Braun and Clarke 2013).

Data Analyses

Reflexive TA progresses in six phases during which the researcher engages reflectively with the data and the research process (Braun and Clarke 2006). For this paper, the core of the analytical work was done by the first author of this paper, who, in bi-weekly meetings presented and discussed the progress with the second author. The role of the first author was to work with the data in-depth, while the second author focused on questioning the core assumptions of the analysis, broadening the reflective process, and verifying the theme creation based on the data extracts and codes presented by the first author. For the first phase, familiarization with the data, the first author worked with each interview, one by one. They first listened to the full interview without taking notes or transcribing, which allowed them to gain a comprehensive impression of the person’s meaning-making and recall any feelings and thoughts evoked during the interview. Only then, the first author transcribed the respective interview and progressed to the next interview.

In the second phase, generation of initial codes, we applied mostly semantic but also latent coding strategies (Byrne 2021). Semantic coding, by staying close to the surface meaning of the data and the language chosen by the participant, allowed us to capture the interviewees’ richness in perspectives to support our inductive analysis of the data. However, as researchers in the field with prior research in this area, we did not operate in a theoretical no-man’s-land—latent coding allowed us to use our prior theoretical work and the insights from the preceding survey study to work interpretatively whenever we observed clear references to theoretical concepts (examples for such are connectedness with nature, informal mindfulness, and more intrinsic vs extrinsic types of motivation). Latent coding also ensured that we coded and analyzed the data most relevant to our research question. Furthermore, the goal of the research was not only to explore the mindfulness and PEB factors in separation. To highlight the perspectives of the interviewees about the role of mindfulness for PEB change and to understand the mechanisms of the process, we also coded when we observed relationships between concepts in participant speech. Even though we coded interviews sequentially, there was an iterative process as concepts became more visible over time.

In the third phase, searching for themes, we approached in an inductive way after the completion of the initial coding. We created the themes by, first, bringing all relevant

and most dominant single codes and relationship codes into an NVivo 12 project map, and manually color coding and rearranging the codes while listening to and comparing data extracts. In the fourth phase, review of potential themes, the nuanced analysis of the quotes in the context of the development of the themes supported a reflective process of prioritization and re-organization of the codes and relationships. This included the addition of some codes and relationships which had not been coded originally but were later identified as crucial in the comparison of individual accounts. An example of this is the addition of the codes “sensory engagement” and “embodiment” after listening to the data extracts stored for the relationship between “formal mindfulness practice” and “present moment awareness.” Only after studying those extracts again in isolation, we heard the nuanced understanding of this connection as related to their body and senses. However, because of the increasing complexity of the interlinkages between crucial concepts, we transferred the content from NVivo 12 into the Gephi 0.9.2 software to build a thematic map that helps to gain an overview of the factors and relationships cited by the participants and judged meaningful by our analytical work.

The thematic map in Fig. 1 is the visual end result of our engagement with the data across the multiple stages of the reflexive TA approach and illustrates how the five analytical themes have been identified as groups of interrelated factors for change. We stopped the creative process when we found that the themes were sufficiently broad to tell one common story, as well as inclusive of idiographic variations between the different change factors, because not all factors are seen as (equally) meaningful by all interviewees. We then proceeded to the final phase, naming themes and writing-up, for which we chose to use a similar blend of interviewee speech and interpretative meaning-making that was central in this research process.

Results

The 13 adults interviewed for this research varied regarding their personal perspectives on environmental issues and exposure to mindfulness practices. Despite their differences in the way they understand and practice mindfulness and PEB, common patterns of thought and experiences were able to be extracted. We created five highly interconnected dominant themes with shared observations of mindfulness-based mechanisms for PEB change. Because reflexive TA is a storytelling process in which the story is the interpretation of a collective narrative based on personal accounts and commonalities between cases, the theme descriptions frequently give voice to the respondents describing their motivations and experiences. The five themes were as follows: (1) awakening of the mind, (2) awakening of the heart,

(3) internalizing environmental motivation, (4) eudaimonic well-being, (5) deepening mindfulness.

Theme 1—Awakening of the Mind: “Becoming Aware of Myself in Context”

According to an often-cited definition of mindfulness from the Western psychology perspective, the primary goal of mindfulness practices is to cultivate an “awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment” (Kabat-Zinn 2003, p. 145). Consequently, in the interviews with the participants, a greater ability to focus on the present moment and an increased awareness of both the internal and external experiences emerged as an important effect of the mindfulness practice. In the experience of the respondents, the growing engagement with formal and informal mindfulness practices increased the emphasis they place on the physicality of their experience within their bodies.

It sounds more intellectual than it is, it’s not that intellectual. The more I can stay in touch with my embodied experience, somehow, the rest of it kind of flows more? Don’t know if it makes sense, but when I’m aware of my body and my breath, I don’t act unmindfully that I would therefore regret afterwards. It’s more of a sense of integration, the whole of me is kind of there, rather than being split off. (Sabine)

We observed that this increased embodiment of experience, described by researchers as a shift from a top-down, conceptual awareness towards a bottom-up, interoceptive awareness (Khoury false 2017), became an important factor for the way the respondents relate to their PEB (see theme 3). Furthermore, in parallel with the development of increased internal awareness, the practitioners also reported a stronger awareness of their external experiences. This includes a widening of perspective and environment around them, which they saw as the reason to also feel a greater appreciation of the natural world.

It’s like, oh, this is such a lovely place to be, when you sit and listen, and see and experience the feel, it’s a marvelous thing. Whereas before it wouldn’t even have occurred to me. (Martin)

The participants experienced this change in awareness of the natural world as mediated again by the embodied, sensory experience of it. For example, Martin and Hanna explained how they found it easier to stay focused when meditating in nature, because they could engage their senses, e.g., when hearing and sensing the wind. For those with an informal practice, this awareness of the

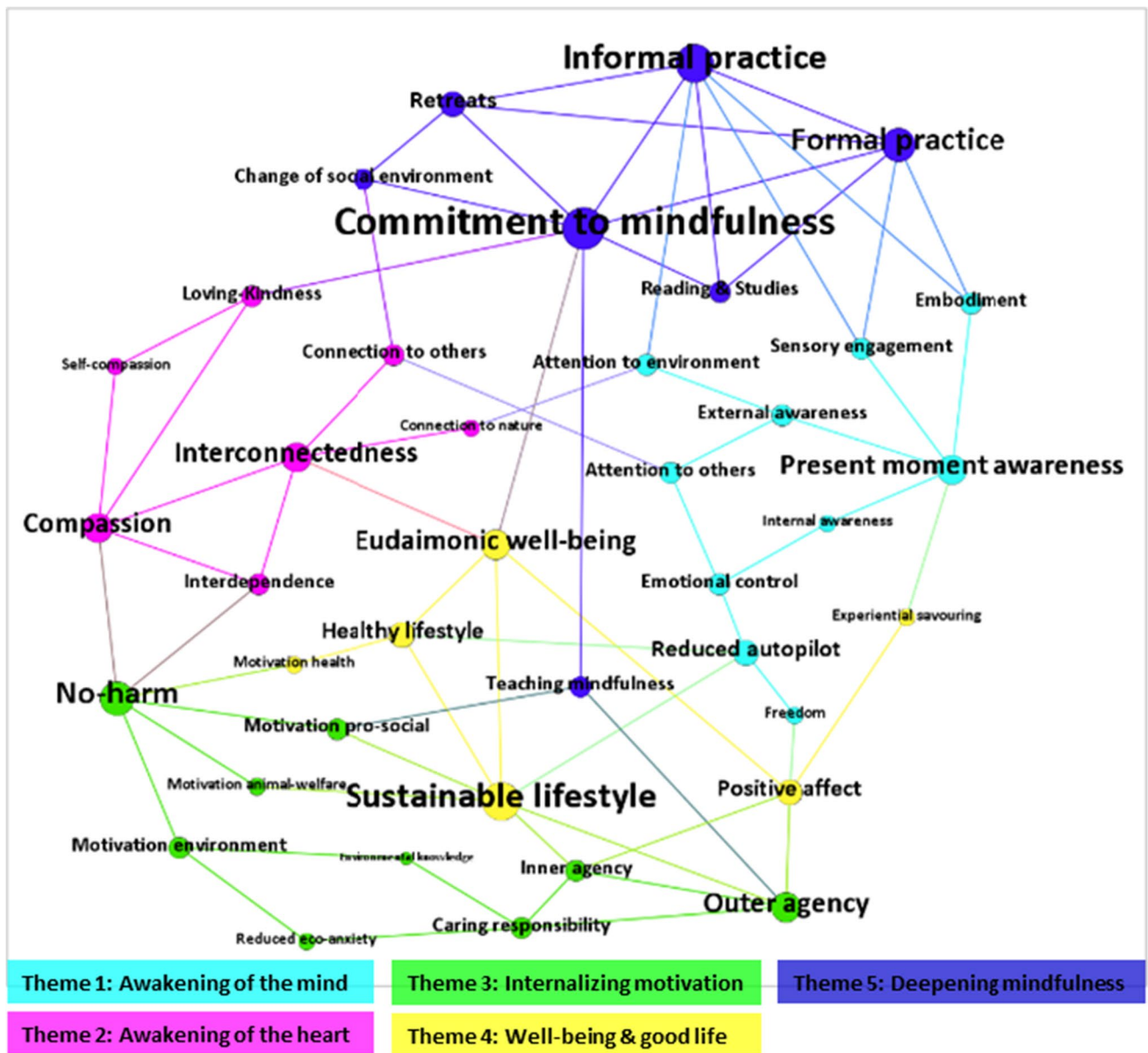


Fig. 1 Thematic map of the factors and relationships between mindfulness and PEB. The color of the codes represents their affiliation to one of the five analytical themes

natural world has become an integral part of their practice throughout the day:

I stopped and looked and saw the environment I was in, but my mindfulness did that, I was able not roam around as I used to, but to walk and see a flower, and I remember, when I was doing analysis for my own practice, I stopped and took time to smell the roses, that's cliché, but if you stop and mindfulness makes you stop, then you just [hesitates] - it follows. You become aware, you do. But the trick of course is to remember to be mindful. Sitting formally and then

getting up doesn't do it, that only starts the exercise. You really have to do that every second, every second [laughs] oh you know it's interesting, I feel really light-hearted and full of joy now. (Heather)

The enhanced awareness of internal and external experiences that arises from practicing mindfulness consequently strengthens the participants' ability to recognize harmful habits as they happen as well as to consider their impact. Many of the participants describe how greater awareness allowed them to more frequently leave the "autopilot" mode, where harmful behaviors are driven by habit. Particularly

eating habits were an often-mentioned example of improved self-regulation based on mindfulness. Yet the improved self-regulation and reduction of automatic behaviors also apply to behaviors with a negative impact on the environment:

My responsibility, not being so automated, not being so detached from everything that comes at a cost. You know, that plastic cup, you know, I think it does that because you just stop, you're less distracted and you realize that they are not just throw away decisions. (Jina)

We observed that this awareness of repetitive habitual actions also opened room for a deeper reflection upon the inner mechanisms and root causes for environmentally harmful behaviors. Three female practitioners, Heather, Sabine, and Teresa, brought up how mindfulness helped them to understand that buying clothes was a way of coping with stress and anxiety in their lives:

So I think it made me less wanting stuff. I mean I still like to get clothes and look nice, but it's not like everything. So I'm, I think you get to this place because you spend, like mindfulness is spending time with yourself, you know seeing yourself, and noticing what's actually going on. [Interviewer: And then, what happens when you realize what's going on?]

Well, you realize that like actually, you're a bit anxious about you know, ageing, and going out and buying 10 new dresses and creams, you know, that's the symptom of that, whereas before, you'd just do it. And now you understand like, you know, you get an anxiety about something and you might react, whereas before you would do the reaction without really knowing why, or what's driving it. [thinks] Because I suppose you just sit there and you ask, what's really going on right now, you ask yourself that question. I mean you do the following of the breath of course, but a lot for me is self-inquiry. (Teresa)

This dialogue exemplifies how mindfulness can help the inquiry about the origin of the desire to consume. In the experience of these participants, the deeper understanding of the root causes of their consumption allowed them to reduce their consumption levels. The participants further mention that this change in perspective on consumption gave them an opportunity to detach from stress-induced cravings which participants perceive as liberating. Instead of searching for a quick gratification provided by the purchase of a desired item, the awareness of the deeper motivation for this action allows practitioners to choose a different way to react to their needs. For example, Heather shared how mindfulness empowered her to change a lifelong approach to automatic consumerism. By deciding to not buy anything new for a whole year, including Christmas presents, Heather discovered a way to find freedom from early conditioning:

And it came to me when not buying clothes, at the same time, it's interesting because my mother was a tailoress and she would make a lot of clothes as a child, and I like clothes and looking smart, and have nice clothes, so that was interesting that change of a deep important part of my life, just changing it. You know, the injunction of you always buying clothes and look nice. Now, that's a good thing actually, it's really empowering that you can change, the parental voice, and all sorts of voices, it's classic therapeutic work. (Heather)

A crucial aspect of the increased awareness the participants perceived is the recognition that certain habitual behaviors do stand in conflict with the deeper values and convictions the respondents say they hold.

Yeah, it's... I know I keep saying it, awareness, awareness, I substitute mindfulness and awareness, they are interchangeable for me. If you are aware of something, you can choose to ignore it, or do something about it. I guess it brings you down to a personal choice how you want to live your life. And it's like people go through life unaware of things, taking a lot of things for granted, you know people just might jump into their cars and not be aware of the impact that the car has on the environment, or they smoke, or they eat meat. (Will)

As shown in the quote by Will, his regular practice helps him to distinguish such moments of cognitive dissonance. It also shows that he sees mindfulness as a chance to stop and re-evaluate his decisions in line with his inner ethical compass.

In summary, it is not a new discovery that the increased awareness of automatic behaviors and congruence with internal values plays an important role in the process mediating between mindfulness and PEB (Fischer *et al.* 2017). Yet, this participant sample offered additional insights into the unfolding of such mindful awareness over time, particularly the importance of the increasing embodiment of internal experiences and the sensory engagement with external experiences. They described the response to acting in dissonance with one's deeper intentions as an almost visceral experience (see theme 3). Furthermore, Martin, Hanna, and Teresa shared how this increased awareness of inner processes can sometimes trigger challenging emotions. Therefore, theme 2 explores the importance this sample of participants attributes to the development of certain qualities of the heart, such as kindness, compassion towards self and others, and a sense of connectedness and interdependence with the world.

Theme 2—Awakening of the Heart: “If Nature Is Suffering, I Am Also Suffering”

Even though the interview guide did not prompt the participants to reflect on the qualities of the heart, this

participant sample unanimously agreed on their centrality to the practice of mindfulness and their performance of PEB. In Buddhist teachings, the concept of mindfulness is taught in parallel to affective qualities such as gentleness, kindness, generosity, and tolerance (Grossman 2010). The development of a state of mind that involves a blend of attention, awareness, and memory is seen as the foundation for the successful cultivation of compassion (Tirch 2010). One common definition, based on Buddhist writings but also used for secular programs, is that compassion (in Pali: *karuna*) is “a sensitivity to suffering in self and others, with a commitment to try to alleviate and prevent it” (Gilbert 2014, p. 19). Yet while the inseparable relationship between mindfulness and compassion is explicit in the Buddhist context with various meditation techniques, ethical guidelines, and philosophical perspectives designed to foster the development of compassion, Western MBI have approached this concept in a more implicit way, mostly by encouraging a non-judgmental and kind attitude towards any arising experiences during meditation (Grossman 2010; Shapiro false 2018; Tirch 2010). Surprisingly, despite their varying degree of exposure to formal teachings on compassion, all interviewed participants except for Karen mentioned compassion in relation to their mindfulness practice.

In the West, the most practiced technique to initiate training for a compassionate mind in both secular and Buddhist contexts is the loving-kindness meditation, which was also mentioned by several of the participants interviewed for this study (Quaglia false 2020). Loving-kindness (in Pali: *metta*) is distinct from compassion and involves the desire to bring happiness and a positive emotional experience to the self, known others, and all beings (Tirch 2010). Travis narrates how this practice helped him to widen his perspective beyond the self and include animals and nature:

Absolutely, yeah, yeah. It’s just, yeah, definitely, a lot of the loving-kindness meditation include animals in them [laughs] and there are a lot of metaphors from the training, I remember when you walk on the earth, treat each foot step as a kiss on the ground sort’ a thing, something like that, that stayed with me and it’s just, slowing down and really looking at flowers, and trees, and birds,... it hasn’t been huge, but I see opportunities now to enjoy that much more than I used to. (Travis)

This widening of perspective and increasing sense of connection with both human and non-human life were common threads in the accounts of the participants. Their change in perspective tended to emerge out of the greater embodied awareness of internal and external experiences described in theme 1, combined with the conscious and repeated stimulation of warm and kind feelings towards the self, others, and nature during loving-kindness and

other compassion-related practices. Jina and Cameron also described this process of widening their perspective as steady, subtle, and slow.

In relation to PEB, this broadened perspective of interconnectedness is relevant as it helps to reveal the environmental impact of daily behaviors. Dietary habits were often mentioned to exemplify this shift in perspective, such as expressed by Hanna who narrates how her concerns slowly extended from the well-being of animals to also include thoughts on personal health and more abstract environmental concerns:

So the fact that I didn’t want to be eating animals, that was in my awareness, but nothing else really. I wasn’t thinking about nutrition, I wasn’t thinking about pesticides, yeah. I think it’s kind of, it gives me a bigger picture so I think, who actually, what was the journey of the food, who was involved and you know, how far has it been, and what happened to it along the way, that kind of thing. (Hanna)

In Buddhist psychology, the change of perspective towards a greater universal connection is central to the practice of meditation and essential for the development of compassion. Based on the contemplative experience of interconnectedness, the regular practitioner is said to ultimately develop an altruistic motivation towards alleviating the suffering of all beings, which Buddhists describe as an “awakened heart” (in Pali: *bodhicitta*) (Habito 2007; Tirch 2010).

In this sample, it became evident that feelings of connection towards other people have evolved with the on-going practice of mindfulness, which even motivated Cameron, Marcus, and Daria to enroll in mindfulness teacher training programs to share their insights with others. Yet due to the focus of this study, the practitioners were prompted to deepen the exploration of their connectedness with nature. A common reflection was that meditation encouraged a stronger feeling of being one with nature, which for some reached as far as into their physical experience, particularly through the breath:

I didn’t have that sense of interconnectedness, that’s I guess one of the shifts that happened, seeing myself as part of the world and seeing that the trees, you know, we wouldn’t be alive without the trees, and sitting in the garden, I’m breathing in and out, and we’re exchanging molecules at the basic cellular level. I never used to think like that, I wonder what is that, to think like that, I just didn’t have that approach to life. (Sabine)

The relationality with nature also was described as a starting point to developing stronger feelings of compassion. For example, Jina explained that “nature has been the window,

the doorway to compassion for her,” and that nature is “what provides her with access to compassion.” Furthermore, the sense of being one with nature also was recurrently named as a source for growing compassionate feelings towards the environment and the experience of interdependency between personal well-being and the well-being of nature:

[pause] ehm [chuckles] hm there is so much to it, I am nature, I am all those elements and I am part of nature, as I am part of this universe. So, when I look after myself, I look after this body, I also have to look after my environment. My environment influences me and influences everything around me, the people around me. And if I want a healthier and happier life, I also have to look after what is around me, so nature is not something that is separated from me, it is me, and if nature is suffering, and animals are also suffering, I am also suffering. I am part of this suffering, and I do feel deeply in my heart when nature is suffering, and animals and trees, it gives me such a good feeling when I am in nature, I feel very connected, I feel calm, I feel quiet, and I feel part of it, I feel I am nature, so I want to be, most of the time I want to be in nature. So, if I am not careful, if I don't protect nature, one day we might not have this to enjoy and then it affects everything nature gives to us. (Judith)

The feelings of interconnectedness and interdependence ultimately increased the participants' desire for reciprocity with nature as the relational subject, which is explored in more depth in the next theme.

Theme 3—Internalizing Environmental Motivation: “I Can't Just Walk Past It Now”

The previous two themes outlined how a stronger commitment to integrating mindfulness into life both on and off the meditation cushion supported the awakening of the qualities of the mind and the heart. Through a more embodied presence and awareness of themselves in context, the participants started to broaden their perspective to progressively include others and their environment. Combined with an increasing intentionality for kindness and compassion, the participants also benefited from an expanded sense of connectedness and interdependence, which ultimately strengthened their desire to reduce suffering both for themselves as well as other human and non-human life. Based on those fundamental changes in perspective on the self, this third theme is dedicated to documenting the motivational shift for PEB in this sample of participants.

A first indicator for a motivational shift is when the interviewed practitioners reported the development of a conscious intention to avoid causing additional harm through their actions, which in Buddhism, Hinduism and

Jainism is known as the principle of no-harm (in Pali: *ahimsa*) (Howard 2018). While Judith and Will explicitly state *ahimsa* as a guiding principle for their lives, others evoke a sense of it through their speech:

Ehm, yeah, there's a massive, massive difference. Before, I thought I was the world and the world revolved around me. And now I am a little spec that comes and goes, trying not to do so much damage while I'm here. (Martin)

While it could be observed that this process seemed to start with a primary intention to reduce the suffering of animals, the growing engagement with mindfulness practices encouraged the practitioners to slowly incorporate the whole environment. Further exploration of the participants' environmental motivations revealed that the ethical principle of no-harm was experienced to be supported by a deeper layer of emotions related to the awakened heart, such as love, empathy, and compassion for nature:

The ethical stuff is because I feel things quite deeply, so I'm bothered by things, things matter to me, it matters to me how people and animals are treated, and how we're treating the earth. (Hanna)

With growing practice experience, the desire to not inflict harm on other beings appeared as increasingly integrated within the emotional self-concept of the participants, which therefore seemed to go beyond a purely normative thriving to fulfil a moral codex. Rather than feeling obligated, a common experience of the participants was a drive to protect the environment because of their feelings of love and gratitude for nature. These feelings appeared the strongest for those participants who also mentioned an established awareness of interconnectedness with other beings and nature. The understanding that every individual behavior has the potential to ripple out and create negative impacts, combined with their strong emotional and relational bond, helped them to feel a strong responsibility to avoid even indirect suffering. This sense of interconnectedness made the participants internalize the suffering of the environment, which caused them to experience the environmental decision-making as an almost visceral experience:

[long silence] I suppose it's about ehm [silence] being connected. If you feel connected, I think, you just don't, it's quite an instinctive thing, but you don't want to do things which are anti that quality of engage, or you know, connected to everything around me. I don't see myself quite as, you know, this is me and the rest of it can do whatever, you know, I fight my fights and stuff. Just that sense of being part of a whole, I would say, that's a very gut thing, you know. Like last week, I went

down to the shop and there was a salad in plastic, and I simply couldn't buy it. It's just the quality, you know, when you are connected to something, you... it's going against that quality of connection, there is a quality of irresponsibility, ehm, within all this. (Cameron)

For those participants who reported a strong emotional bond with nature, this embodied experience of their decision-making creates a drive to protect nature described as instinctual. They feel that because of their growing engagement in mindfulness, it has become increasingly impossible for them to engage in harmful actions. Furthermore, this instinctual experience can also serve as an encouragement for them to make an additional effort to even benefit animals and nature:

I give you an example, sometimes you're on the beach and you walk past something, and I just think, I can't just walk past it now, I would always have to go, no matter how inconvenient it is or I don't have another bag or whatever, I'm just gonna have to pick that up, even if I have to walk another mile to put it somewhere, I have to do that now and I don't know if I would have put... I think I would have been able to be more distracted from that in the past. Whereas now, because you're more present, I can't walk past that, and you can't just go "oh well". And that's not to say I never do that, but I find it creates more challenge for me now. (Jina)

Jina's account exemplifies how the awakened heart and mind work together to PEB, even those involving effort like picking up other people's trash and walking another mile to dispose of it correctly. First, the increased attention to the present made Jina notice the waste, and instead of engaging in an automated habit to continue walking, she stopped to feel the effect of the pollution in her heart. In congruence with her heightened sense of love and care for the sea, she decided to act and remove the plastic.

Consequently, a common observation among mindfulness practitioners was that doing things for the environment made them feel "good," also often expressed as feeling "right." In the nuance of the descriptions, the participants experienced a sense of feeling right as distinct from righteousness as the satisfaction of following a moral prescription. Rather, this form of feeling right seemed to stand for a behavioral decision that is in harmony with the participants' emotional and relational experience and does not go against the gut instinct described above:

It feels like it's the right thing to do. It comes from nearly 10 years now of, ehm, I went to Bangor University for the mindfulness course... it seems that, ehm, when I was younger, I was maddened and ran around. I think I'm motivated by... [thinks] it just feels right,

by a deep sense of this is the right, wise, kind thing to do. That would be my motivation. [...] I feel very content, and happy, and good, in a deep way, not in a huh [loud shout] way, it's like, yeah [whisper] quiet, it's an internal knowing, like everything just clicks together. (Heather)

In the experience of those who share a deep relational connection with nature, the PEB no longer feel as effortful as before they engaged in mindfulness. Corresponding with the self-determination theory (Pelletier 2002), it could be noted that with growing levels of reported relationality, feelings of guilt and obligation subside and make space for feelings of care, reciprocity, and well-being. However, this does not completely resolve the conflict of values that often are associated with impactful behaviors:

Well, flying [is important]. I really just tried to cut that, I didn't fly anywhere in two years, but I am actually going to visit my brother, with his new baby, in Switzerland in a few weeks' time. It just feels like a priority to do that, to support him and his family. But generally, I take more holidays in the UK. And we do have a car, but I use it very little. We have this on-going conversation, should we get rid of it completely, but then we have very elderly mothers and three adult children, so we use it a little bit. I kind of, that's my aspiration to not have a car. (Sabine)

Other interviewees reported similar moments of internal conflicts, such as Daria and Markus, who do like to travel by plane because they enjoy visiting different countries. Karen pays for carbon offsetting when traveling by plane for work. Teresa opts for a diet high in animal-protein products due to her health condition, and Jina refrains from adopting a strictly vegan or vegetarian diet because she also feels supportive to small-scale family farms in her rural area. Within the descriptions of such internal conflicts, it became apparent that the participants make a conscious effort to bring awareness to those difficult decisions. They seem to approach environmentally harmful actions with a high level of reflection and counterbalancing of their diverse values and priorities, even if the final decision may end up being in detriment of the environment. Another impediment to their motivation to maintain their PEB is the negative influences of stress, for example, caused by work:

I would like to be more consistent with it [reducing animal-protein diet] but again with working, it comes and goes. (Martin)

As further elaborated on below, the mindfulness-induced motivation for PEB is connected to an increased state of calm and "being" in the present moment. The stress-related loss of this connection has been described as immediately harmful to following the intention to act in a more healthy or pro-environmental way.

Consequently, the mindfulness-induced process of gradual internalization of their pro-environmental motivations for most interviewees seems to start on the individual level, and later expand outwards. In Heather's account, it can be traced how she experiences the inner agency:

Compassion starts with me, and from that, others. Otherwise, you give your energy away and you are always campaigning, and telling people,... just keeping my quiet and do it yourself. Really, and then you can sustain that. I think if each of us kept quiet and did... we could sustain it, sustainability of an attempt to keep well. I think that's very important; I think it's your intention, in all sorts of things in life. (Heather)

This form of inner agency is nourished by the above-mentioned feelings of interconnectedness, which the practitioners understand to make every personal action important. This inner agency is described as a continuous evolution that they understand as particularly meaningful when accompanied by an intention to work on themselves with an attitude of compassion and self-acceptance, rather than a harsh sense of obligation. Generally, this inwardly directed agency is compared to a growing sense of responsibility for the wider impact of their actions. This can at times feel burdensome to the committed practitioners because they are aware that their actions alone might not change the course of the ecological crisis. Nevertheless, there was great determination and endurance in their PEB and increasingly, a motivation to also inspire others through their own behavior. Particularly for those who reported strong feelings of connectedness with nature, such as Jina, Sabine, Daria, and Judith, an outward-directed sense of agency becomes increasingly prominent, for example, in the form of environmental activism and volunteer work (see Table 1):

I do really believe that my mindfulness practice has partly brought me to this tipping point much quicker, and just talking about it and exploring what is that relationship and what does it mean, really emotionally brings that up for me and makes me realize how much more important it is to act, and not be passive within that. (Jina)

At the same time, because the participants feel that this sense of outward-directed agency is fueled by an awakened heart rather than moral prescriptions, they also feel less divisive towards those who do not care for the environment. They describe that working for environmental change has become "less stressful and less driven by urgency" (Teresa), and that they feel more accepting of others and their priorities:

Some of my friends have been involved in meditating in front of Barclays bank, and you know, if I do get involved with that, I'm not going to do it from the side of anger and hatred, but trying to come from that no blame, we're all in this planet together, and we want to

live good lives, but kind of seeing that actually, we can have really good lives, and better lives, if we have this concern, but it's not sort of judgmental and blaming, if you know what I mean. So that's more like how it was towards myself and other people, there has been this shift there, if that makes sense. (Sabine)

At the end of the interviews, all participants had the opportunity to reflect on what they believed to have come first into their lives, their environmental awareness or mindfulness, and to elaborate on the relationship between those concepts. All participants confirmed that they believe in a positive impact of mindfulness on environmental awareness. In some cases, environmental awareness clearly arose after the participants started practicing mindfulness (Martin, Markus, Travis), even though Markus and Travis attribute much of this awareness to living with partners who care. The rest of the group reported to always have cared about the environment. However, they also declared that mindfulness has helped in clarifying and strengthening their feelings and commitment towards the environment. Jina, Markus, Sabine, Will, and Daria also shared their belief that the individual process of mindful "awakening" (Heather) to environmental issues could reach scale. For example, even though nature was always very dear to her, Daria has recently graduated from a mindfulness teacher training because she believes that it is a way to make others more aware of the beauty and value of nature and encourage them to care more. The interviews also revealed how the meaning of the expression "environmental awareness" changes for mindfulness practitioners:

I guess some people are aware, but they don't care, and that's the scary part, that they don't care, particularly when it's the politicians who have the power and money to change things.

[Interviewer: In the way you have described awareness, do you think they are aware in the sense of what you meant?]

Yeah that's a really good point, I think they know about it, but they don't care, they are not aware in that mindful sense. You know, Donald Trump should start meditating [laughter]. (Will)

We observed that the participants conceptualize environmental awareness as something that goes beyond a purely intellectual knowing, and that it contains an intention of responsibility and care that arises when one feels more connected with the natural world.

Theme 4—Eudaimonic Well-Being: "Being Instead of Doing"

The theme of well-being was a prominent discussion point during the interviews, because most participants started to

engage in mindfulness with the intention to improve their psychological and/or physical health. Generally, the interviewees shared that they observed changes in their well-being and that they enjoyed life more since they practiced mindfulness. As presented earlier in theme 1, the awakening mind allows the practitioners to live their lives in a more experientially rich way, thanks to stronger present-moment awareness and embodiment of internal and external experiences. A recurrent expression in relation to this is that the participants intend to spend less time in the “doing mode” and more time in the “being mode.” Throughout the progressive shift towards spending more and more time being in the present moment, the participants recognize that nature has become an important source of joy and well-being for them. As previously discussed in themes 1 and 2, the awakening mind and heart enable the practitioners to take in more of the environment on the sensory level, and therefore, to establish an experiential connection with nature. Therefore, all interviewees reported that they increasingly enjoyed spending time in nature, and that the search for the beneficial effects of nature has become more intentional:

And I suppose it’s also the antidote to that, I notice how stressful and massively overthinking and ruminating and rushing life can be, and nature feels like it provides the opposite of that to me. Maybe there is a lot of language, a lot of non-classic cognitive thinking, it’s just an emotional sensory experience of being present with things I find really beautiful. And I crave that, I crave more of that now that I get older. (Jina)

Such beneficial interactions with nature also seemed to strengthen the participants’ appreciation of nature, and therefore, their wish for reciprocity in this relationship. Particularly those participants who feel very interconnected with nature experience their personal well-being as no longer separated from planetary well-being.

I just think it’s the best possible lifestyle, it’s good for me, for my health, for the animals and the environment. It’s a win-win situation around living that sort of lifestyle. It sort of comes back to, I think it’s a Hindu lifestyle called ahimsa, such as not doing harm to anything or anyone. Just moving through life as peacefully and calmly as possible. (Will)

In line with this understanding of their well-being as interconnected, they have an intention to live a lifestyle that is both healthier and more pro-environmental.

Therefore, the engagement in PEB appears to be an integral part of a general attitude of kindness and their aspiration to live a more ethical life:

What I’m thinking is, when someone wanted to experience greater well-being, I wouldn’t say to them just prac-

tice mindfulness, I would say look at the ethics in your life, look at your friendships too, to me, that’s part of it. So yeah, my well-being has hugely improved, hugely, but it’s one of a number of changes I’ve made. (Sabine)

The tendency of the committed mindfulness practitioners to aspire to a more ethical and meaningful life, or in the words of Heather, the “good life,” leads us to another aspect that had a strong presence throughout the interviews: an eudaimonic perspective on well-being, and therefore, an understanding of happiness as decoupled from consumption. Instead, their consumption seems to be oriented along the guiding principle of need satisfaction:

So, that would be my default position, not, I mean I understand you have to make money, but that’s not how I approach things. What is the kind and wise thing to do here, and from that question, almost asking yourself not what you want, for me, but what do I need in my life to sustain my life every day, as I get older, what do I need, and I need to be aware of what I eat. When you say what do I need, it becomes manageable, sustainable, and everyone can do it. Everybody knows, deep down, at the human level we know what we need. We need to be cared for, we need to belong, we need to thrive. (Heather)

The practice of mindfulness helped the practitioners to become more aware of their needs, and to recognize the importance of non-material need satisfaction. As Sabine reflects on the mindfulness-induced changes in her life, she describes how she and other fellow mindfulness practitioners slowly started simplifying their lifestyle:

Well, I think that if you really get into mindfulness practice, you really start doing, it’s like you can’t avoid this sort of more spiritual aspect of that, really. And maybe some people do, I’ve got friends who are mindfulness teachers and they sort of teach people who work in the city, and there is nothing wrong with people working in the city, but my sense is that people I meet who had those sort of jobs, for example, like me but maybe more extreme than me, they start seeing that that kind of living doesn’t nourish them that well, and all the planet. Does that make sense? So that people start, I’ve made this journey, and I’ve seen other people doing it too, that the kind of awareness starts to expand and you realize that you actually, a simpler way of living is more satisfying and that consumption, and rushing about doing lots of things, is actually not necessarily the most satisfying way to live. And that simplicity implies taking better care of resources we have, just sort of, they are interconnected, I’m not sure I’m explaining it very well, but it’s this journey that I’ve kind of gone on. And I see it in other people, too. (Sabine)

In congruence with the principles of eudaimonic well-being, the participants seem to understand PEB as one aspect within a wider lifestyle concept where need satisfaction and simplification are central to feeling more in harmony with oneself and the planet.

Theme 5—Deepening Mindfulness: “Taking the Practice Off the Cushion”

All respondents reported to a varying extent that they set aside time to practice formal, non-moving meditation, for example, by applying body scans or paying attention to their breath. Table 1 offers an overview of the time each respondent meditates per month and has practiced over their lifetime. Yet as can also be seen in the same table, not necessarily the individuals with the least meditation experience are those with the lowest performance in PEB. Jina, Daria, and Karen are individuals who despite being at the lower end of the formal practice range, actively engage in effortful and impactful PEB such as choosing local holidays, reducing animal-protein consumption, and engaging in environmental activism. And even though Martin meditates the most hours per month, he has the highest meat consumption levels despite his awareness of its negative environmental impact. Therefore, contrary to the common assumption that formal meditation should be associated with increased PEB, the interviews showed that another factor related to practice was central to the participants’ performance of PEB: their commitment to mindfulness as a way of living. For example, Sabine recalls a period when her commitment to the practice started to deepen:

When I was 19, I went to medical school, briefly, it didn’t work out well for me and I had a very difficult year. I went to see that clinical psychologist who taught me this very simple mindfulness breathing practice, so I sort of used some meditation, you know they are not the same, but they kind of are as well. So, I didn’t have a sense of trying to live in the moment, it was just this technique at age 19 that I found helpful. It’s not until really 10 years ago that I saw potential for changing my life much more deeply by committing more deeply to it, and that’s when I got involved with the Buddhist movement. I think there also was a deepening of commitment with the practice, that I just thought I’m not gonna just do it occasionally as a quick fix on myself, it doesn’t really work that well, I mean it helps, but when you really commit to practicing every day, and really bring it into your life, that’s when you start feeling a lot more benefit, and I started to see that in myself, yeah. (Sabine)

Such committed mindfulness practitioners like Sabine make a clear distinction between practicing mindfulness

as a self-help technique targeting immediate improvement of every-day suffering, versus taking the step to integrate mindfulness-based principles into one’s lifestyle which she sees as a way to support long-term well-being and meaning.

We further observed that this conscious deepening of the commitment towards mindfulness enabled three major change factors in support of PEB. Individuals with explicitly high commitment to mindful living principles (Cameron, Sabine, Jina, Daria, Judith, Heather, Sabine, and Will) also reported motivation and curiosity to learn more about the practice. For example, they actively engaged in studying mindfulness-related concepts through literature and expert talks, which often happen to relate to Buddhist content and interpretation of the practice. This encourages a familiarization with those Buddhist cultural and ethical principles which call for a more respectful treatment of animals and nature, e.g., by practicing vegetarianism.

We also identified a change in the social environment of participants who regularly participate in meditation-related events, such as meeting with a local group or taking a retreat. The strengthening of the ties with other people and institutions where environmental principles are followed might help to create favorable social norms regarding PEB. For example, Jina mentioned how she was inspired by the serving of delicious vegetarian and vegan dishes at meditation retreats and continues to eat more of those in the period after the retreat.

Finally, the third observation is that with a growing commitment to mindfulness, the desire to cultivate a mindful state extends beyond the formal meditation time and into the daily life which results in an increasing engagement with informal mindfulness practices. A widely agreed definition of informal mindfulness practice does not yet exist, but it has been described as “weaving mindfulness into existing routines through engaging in mindful moments and bringing mindful awareness to everyday activities, such as mindful eating or mindfully washing the dishes” (Birtwell *et al.* 2019, p. 90). Or, as Ellen Langer defines (non-meditative) mindfulness, “the process of actively noticing new things” (Harvard Business Review 2014, p. 2). Informal practices such as mindful dishwashing have been shown to increase state mindfulness, life satisfaction, and positive affect and to decrease negative affect, depression, and anxiety compared to control groups (Hanley *et al.* 2015; Shankland *et al.* 2020). While for some respondents like Hanna and Martin, the maintenance of a mindful state throughout the day still poses a challenge; for people like Cameron, Heather, Jina, Judith, and Sabine, the informal practice constitutes an important part of their regular mindfulness practice. With the presence of a strong informal practice, an increased environmental awareness permeates the attitudes and behaviors. Mindfully being in nature and mindful eating were repeatedly mentioned as opportunities for informal practice:

Yes, definitely, even the way I eat, I try to eat mindful when I am eating, cooking, even when I am buying, I am trying to be mindful. I am really there when I am buying, I am buying and not thinking of anything else, and I hold the values within myself, my values of conservation and respect for the food, and I am grateful. Those values of gratitude for the food, I bring those values when I am buying and cooking. (Judith)

While mindfulness programs recommend both formal and informal mindfulness practices, the ability to cultivate a mindful state of awareness is universal to all human beings, independent of formal training (Shapiro *et al.* 2018). Daria recognized that she had practiced informal mindfulness long before learning formal meditation:

And oh, and then I actually, I've been a massage therapist and body worker as well for 14 years, and I think we also did some mindfulness meditation training within that, you know you just sit and center yourself before you give a body work session. I think there is just all these layers of it, growing up in nature, the acting training, the body work training, but I'd say the formal practice, yeah didn't start until 10 years ago with my first retreat, when I saw oh, I've been doing this all my life, I just didn't have a name for it. (Daria)

Daria's account shows that she was able to conceptualize her earlier experiences of paying attention to nature and her body after she learned about mindfulness, but that the labeling of her practice was not necessary to gain the benefits from being mindful.

In summary, as previously observed by Sedlmeier and Theumer (2020), the reasons and timelines for starting and continuing the practice of mindfulness vary from individual to individual. However, it was noticeable that in this sample, the degree of commitment to mindfulness and the engagement in informal mindfulness practices became a crucial factor for the transformative influence of mindfulness in their lives. This understanding of mindfulness as a lifestyle rather than a relaxation technique has weaved itself throughout all presented themes and helps to recognize the processes which link mindfulness and PEB. This concludes the presentation of the five themes which we created to describe the relationships between mindfulness and PEB in this sample of diverse participants. In the following, a thematic map helps to summarize and visualize these findings.

Thematic map

The thematic map (Fig. 1) is based on the codes we attributed to the interview transcripts while looking for answers to the research question. The map presents all the factors that were crucial to the relationship between mindfulness and

PEB in this interviewee sample, and which lay the foundation of the five themes. The color of the codes represents their affiliation to one of the five highly interconnected analytical themes. The size of the codes and their labels is proportional to the number of connections inserting into the same code. Therefore, larger codes are central connector points in the relationships between mindfulness and PEB, as experienced by this sample of participants. The colors of the relationships are defined by the two codes they are connecting, showing that transitions between themes are fluid and not sudden.

Because this thematic map has been created based on our coding strategy and the answers to a set of limited questions from the non-representative sample of individuals, it cannot be claimed that this thematic map is comprehensive regarding the number of factors and relationships between factors. Certainly, had those interviewees been asked questions with a different focus, or had other people been interviewed, or had the transcripts be coded by another research team, or had we used a different qualitative method for analysis, the thematic map would most likely include other factors and exclude some of those presented. It also must be acknowledged that despite our efforts to present five overarching and generalized themes to describe the commonalities of the change processes, each individual has been following their own trajectory of change, where different factors come into play at different times, in diverse order and with varying degrees of importance.

Discussion

While so far, qualitative research into mindfulness-based sustainability education showed inconclusive results (Frank *et al.* 2021), this research with active participants points towards a positive relationship between the engagement with mindfulness practices and PEB. The participants interviewed for this study confirmed that the practice strengthened their commitment to PEB. They further emphasized that changes in PEB were gradual and slow, and emerged as a small part of the broader changes provided by the continuous engagement with the practice, such as a change in their well-being and social environment. Because of the many limitations of this study, no claims of causality between mindfulness practices and PEB improvements can be made. However, our reflective and interpretative approach enabled us to trace the five most important mechanisms for a positive change as experienced by the sample of participants interviewed for this study.

Theme 1 describes the improvement of self-regulatory skills through mindfulness practice as an important mechanism for mindfulness-based PEB change. So far, the self-regulation aspect has already received much attention for

the theory and research around mindfulness and behavior change (Schuman-Olivier *et al.* 2020). This research showed that particularly the physical aspects of embodiment of experience and the sensory engagement with the environment are important for this improved self-regulation. Furthermore, the combination of mindfulness with nature exposure might accelerate the creation of a bond between the participants and nature due to their increased awareness of the proven positive effect of nature on their well-being (Fabjański and Brymer 2017), and therefore arising feelings of gratitude and reciprocity. Furthermore, meditation programs for Westerners have historically focused on building self-regulation skills long before transitioning towards loving-kindness and compassion practices (Condon and Makransky 2020). Yet this research supports the observation that “warm mindfulness,” infused with self-compassion, supports emotion regulation processes more effectively than just teaching “cool mindful acceptance” (Schuman-Olivier *et al.* 2020).

This becomes evident in theme 2, which identified relational capacities as the second enabling mechanism for PEB change. Kindness and compassion arose as crucial factors for advancing the practice and for creating a sense of interconnectedness which motivated participants to transcend their own interests and become more pro-environmental. The degree to which an individual has already developed their relational capacities as an adult has much to do with their socio-emotional upbringing (Eisenberg *et al.* 2015); in regard to relationality with nature, this includes the degree to which individuals were previously exposed to wilderness and other natural environments (Chawla 2020). This explains why for some of the interviewees, mindfulness practices helped to discover nature’s importance for them, while others already felt strongly connected to nature since early childhood.

This hints at the possibility that nature could function as a “relational starting point” for developing a long-lasting sense of compassion (Condon and Makransky 2020). Condon and Makransky (2020) postulate that in the context of the highly individualistic culture dominating the Western world, meditation has more often been used as a tool for individual self-help rather than to build the inner capacity that is needed to relate to others in an inclusive and unconditional way. Future research could study if a more intentional inclusion of nature in classical mindfulness programs would facilitate the development of relational capacities of participants, as well as their connectedness with nature and motivation to engage in PEB.

From the experiences of this interviewee sample, self-regulation skills and relationality with nature arose as indispensable foundations on which pro-environmental motivations and behaviors can grow. Based on these, theme 3 describes the mechanism of internalization of motivation through mindfulness, meaning that behavioral decisions

become more self-determined and regulated purely by the individual’s drive to act in congruence with their internal values and beliefs. Schuman-Olivier *et al.* (2020) argue that these motivational changes due to mindfulness have so far been underestimated in their role in behavior change and need further research. Indeed, the interviewees describe environmental carelessness as increasingly counterintuitive because it goes against their profound awareness that their own well-being is interdependent with the well-being of the planet. This sense of self-determination is promising for the creation of long-lasting PEB change, because it persists independent of any externally imposed normative framework (Pelletier *et al.* 2011). This change in motivation also helps to put in perspective the findings by Frank *et al.* (2021) that mindfulness tended to decrease the individuals’ feelings of guilt when not acting pro-environmental. While this could be read as an adverse effect of the practice, we interpret these results in the sense that to support long-lasting PEB and positive spillover towards a broadly pro-environmental lifestyle, it is fundamental that guilty feelings make way to deeper feelings such as love, connection, responsibility, and respect. The maintenance of negative feelings such as guilt, combined with worry and a sense of helplessness are therapeutically unhelpful coping strategies and in the long run could lead to compassion fade and climate anxiety (Clayton and Karazsia 2020; Markowitz *et al.* 2013).

On the contrary, theme 4 reveals that increased eudaimonic well-being is another mechanism of change experienced by the study participants. The interviews revealed that for this sample of participants, PEB and well-being form a positive feedback loop which is reinforced by the practice of mindfulness. The well-being improvements induced by a regular mindfulness practice and greater ability to maintain a sense of “being” instead of “doing” seems to encourage lifestyle changes in the participants’ lives which also benefit the environment. In return, the chosen simplicity of a more pro-environmental lifestyle enhances feelings of satisfaction and purpose in life, a relationship that has not only been shown in the interviews with participants but also in quantitative studies (Giacomantonio *et al.*, 2022). This is in congruence with the mindfulness-to-meaning theory by Garland *et al.* (2015) who argue that mindfulness contributes to a reorientation towards the pursuit of eudaimonic well-being. Ever more, environmental psychologists reinforce that eudaimonic forms of well-being are most compatible with the goals of a sustainable society (Kasser 2017; Venhoeven *et al.* 2016). The positive effect of mindfulness practices on PEB therefore could be related to such a shift in perspective, which is a process that can hardly be achieved over the few months in which mindfulness programs are typically delivered to meditation novices and evaluated.

Theme 5 provides insights into mindfulness practices themselves as a mechanism of change. Contrary to the common

perspective in the mindfulness and sustainability discussion, the results of this study show that the transformational potential of mindfulness in this sample appeared the greatest once an individual decided to integrate mindful living principles into their daily life. Based on these findings, the lifetime hours of formal meditation are not directly relevant to the relationship between mindfulness and PEB, which explains why it is difficult to yield positive results in intervention studies with meditation-naïve individuals. Rather, the point of deepening the relationship with mindfulness varies from individual to individual—for some, this might never happen and for others, it can be sudden even after a first mindfulness training or meditation retreat. Also, even though in this sample, everybody was familiar with the concept and practice of mindfulness, some people might live a life fully congruent with mindful living principles without having conceptualized it as such or ever heard of mindfulness and its associated practices.

Furthermore, because the results show that the informal practice of mindfulness plays an important role for changing behaviors, future mindfulness research should focus on further studying the concept, purpose, and effect of informal mindfulness. For example, popular mindfulness scales such as the Five Facets Mindfulness Questionnaire include specific items referring to the quality of presence in daily activities, particularly within the facets “observing,” “acting with awareness,” and “non-reactivity” (Baer *et al.* 2006). Many of them read like descriptions of informal mindfulness practice, raising the question if a high level of dispositional mindfulness could be equated with a constant engagement in informal practice. Conceptual clarification and delineation between the two concepts could potentially improve their assessment in separate (sub) scales. This crucial role of informal mindfulness and/or dispositional mindfulness for individual PEB change also supports studying alternative experiential strategies for behavior change that do not require the effortful and time-intensive learning of formal meditation skills. A variety of experiential strategies have the potential to support PEB by increasing dispositional mindfulness in peoples’ lives. For example, cognitive mindfulness has been found positively related with sustainable consumption (Helm and Subramaniam 2019). But also cognitive behavioral therapy, acceptance and commitment therapy, compassion training, nature exposure strategies, body work, and engagement in artistic and creative activities could potentially strengthen the mental skills and relational capacities that this study revealed as an important foundation for PEB.

In summary, we were able to create five insightful themes which make a case in favor of the positive influence of mindfulness practices on PEB. However, in its nuance, PEB only improved meaningfully when the practices came accompanied by a deeper commitment with mindfulness as a way of living. This invites us to think about alternative hypotheses which could explain the transformations experienced by the participants interviewed for this study. Almost all interviewees had

exposure to Buddhist readings and teachings, social circles, and practices. It is possible that prior to engaging with the practices, the participants already held values which are compatible with the cultural and ethical context of Buddhism, and therefore, the mindful lifestyle and an eudaimonic understanding of well-being. This might explain why they maintained their interest in the practices, because they support the general changes of their social environment which is more in line with their values. It might therefore not be the mindfulness practice per se that changed their PEB performance, but the change in social norms associated with the life that comes with the practices. This is in line with research showing that interventions that appeal to social norms are some of the most effective to change PEB, particularly when they are descriptive (“focusing attention on what others do not do”) (Farrow *et al.* 2017, p. 7). This is common in Buddhist environments, where practitioners aspire to do no harm and to lead by example. Nevertheless, even if the mindfulness practices only provided an entryway into a new lifestyle that is more in line with the values and social preferences of this sample of interviewees, it is unclear if and how these people would have found access to living their values more fully without engaging in the practice. In summary, we are left to wonder if the practices (and the associated change in social environment) would be able to truly change someone’s values, or if those with less altruistic and ecocentric values are the people who quit the practice or stay with a purely secular and “cold” approach to mindfulness as a relaxation technique. Future research could study more in-depth which role the mindfulness-induced change in social environment plays for changes in PEB performance.

Another hypothesis to consider is that due to the dominant discourse in their new social environment and the teachings associated with mindfulness practices, the participants interviewed for this study think they behave more pro-environmentally because they feel so strongly about their relationship with nature, but that their behaviors have not actually changed. Because of our choice of an experiential analysis approach, we have no way to assess the actual level of behaviors and must believe that they responded truthfully when comparing their performance before engaging in mindfulness and today. Yet, even though pro-environmental intentions and motivations are crucial to initiate PEB, they are not in themselves sufficient to produce a real reduction in environmental impact (Di Giulio *et al.* 2014). Furthermore, an issue associated with actual behavioral performance is that of self-confirmatory narratives discussed by Frank *et al.* (2021). As presented above in quotes regarding the inner conflict associated with difficult environmental decisions, it could well be that the participants more full-heartedly allow for exceptions taken “with awareness” and ultimately use the practice of self-compassion to assuage feelings of guilt or are able to accept that such feelings are part of being human. Future qualitative research should therefore ensure to take a closer look at the nature of such inner conflicts, when PEB

win versus when they lose, and the general quality of the participants' reflections about the environmental issues associated with their behavioral decisions. Because sustainability issues involve a high degree of complexity, it remains to be seen if the more intuitive approach to PEB of this sample also provides the necessary degree of critical self-reflection and flexibility to adapt to new, and potentially opposing, evidence. In general, future research regarding the influence of mindfulness practices on PEB could move towards an approach that assesses to what extent mindfulness can support the development of key competencies for PEB, rather than focusing on the existence of specific behaviors (Fischer and Barth 2014).

Limitations and Future Research

The findings of this study must be read in the context of the limitations encountered by this research, especially within the three major areas of bias: in the sample, methodological bias, and researcher bias. First and foremost, the participants in this sample were self-selected on multiple occasions, when signing up for the survey, entering their contact details for further research, and following the invitation to the interviews. This indicates a high level of interest in mindfulness practice, and/or the broadly communicated research subject "personal and planetary well-being." Therefore, it is impossible to generalize from this sample to all participants. Furthermore, some of the PEB might be associated with broader lifestyle questions, and mindfulness being just one other factor rather than the driver for behaviors (Geiger false 2019b). For example, both Karen and Will ascribed themselves to the "gay community" and the "vegan movement," which in and of itself might imply a certain progressiveness that favors both PEB and mindfulness practices. This also was highlighted by Frank false (2019) who showed that mindfulness-related discourses can vary widely between different social contexts. Because most of the participants have some degree of influence from Buddhist contexts, they might have developed a similar narrative of how mindfulness affects ethical behaviors. To explore this further, discourse analysis would have been an appropriate complementary data analysis method which leads us to the methodological limitations of this study. As suggested by Frank false (2019), a greater plurality of qualitative approaches could have helped to counterbalance the weaknesses of reflexive TA and the experientially oriented methodology. Instead, this study builds heavily on self-reported beliefs and personal experiences, which means that it can hardly be generalized beyond this very specific sample. Additionally, the use of semi-structured interviews invites further bias due to the flexible interview guide, which may limit the consistency of information provided during interviews and reduce the ability to compare between participants (Newton 2010). Because the choice of research goals, questions, and methodology are researcher-driven,

we therefore need to acknowledge the limitations related to us as the researcher team. As environmental researchers with personal (though different) mindfulness practice experience, the research question focused on mechanisms of PEB change which might have underestimated the potential for adverse effects of the practices. Because of the extensive theoretical and analytical work prior to this research, a potential confirmation bias could have transpired throughout the entire research process, despite our best efforts. The best strategy to avoid such biases is to work in multidisciplinary research teams (Van Dam false 2018); however, resource constraints lead us to work in different roles, with the main author doing most of the analytical work and the second author working in a questioning and supervisory role.

Looking ahead, this study leads us to emphasize the complexity of the relationship between mindfulness and PEB. We believe that the growing number of studies looking at only a handful of mediators are doomed to yield small effect sizes and provide little explanatory power to really understand how these concepts are interrelated, and how mindfulness could be instrumentalized in favor of behavioral interventions. Future research should therefore take into account the multitude of factors and their fluid dynamics over a longer period of time, for example by applying methods recently developed in mental health research of therapeutic change processes (Hayes false 2019; Hofmann false 2020). Finally, this study underlines that the combined exploration of mindfulness and sustainability continues to be promising to better understand the personal sphere of behavior change. Yet to gain wide social support for an effective transition to a more sustainable system, it is crucial and urgent to find new strategies, mindfulness and beyond, with which the power of people's inner dimensions, including values, worldviews, mindsets, emotions, and identities can be leveraged for sustainable development.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s12671-022-02004-4>.

Acknowledgements We would like to thank all our participants for their time and openness to share their personal insights with us. Qualitative research depends upon such altruistic gestures of people, and we would like to honor that here. This work would have been impossible without every single one of our interviewees.

Author Contribution UT: designed and executed the study, analyzed the data, and wrote the paper. WS: collaborated with the design, data analysis, and editing of the paper. Both authors approved the final version of the manuscript for submission.

Declarations

Ethics and Consent This study received ethics approval from the Head of the Department of the Centre for Environmental Policy and the Imperial College Research Ethics Committee in May 2018. All persons contributing to this study gave their written informed consent prior to their inclusion in the study.

Conflict of Interest This work was supported by the UK Economic and Social Research Council in form of a scholarship granted to the first author as part of the London Interdisciplinary Social Science Doctoral Training Partnership. Neither of the authors has any conflict of interest to declare.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Armstrong, A. (2012). *Mindfulness and consumerism: A social psychological investigation*. *ProQuest*.
- Babiker, M., Bertoldi, P., Buckeridge, M., Cartwright, A., Araos, M., Bakker, S., Bazaz, A., Belfer, E., Benton, T., Coninck, D., Revi, A., Babiker, M., Bertoldi, P., Buckeridge, M., Cartwright, A., Dong, W., Ford, J., Fuss, S., Hourcade, J., ... Waterfield, T. (2018). *Strengthening and implementing the global response*. IPCC Special Report 2018.
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27–45. <https://doi.org/10.1177/1073191105283504>
- Birtwell, K., Williams, K., van Marwijk, H., Armitage, C. J., & Sheffield, D. (2019). An exploration of formal and informal mindfulness practice and associations with wellbeing. *Mindfulness, 10*(1), 89–99. <https://doi.org/10.1007/s12671-018-0951-y>
- Böhme, T., Stanzus, L. S., Geiger, S. M., Fischer, D., & Schrader, U. (2018). Mindfulness training at school: Away to engage adolescents with sustainable consumption? *Sustainability (Switzerland), 10*(10), 1–22. <https://doi.org/10.3390/su10103557>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners*. SAGE Publications.
- Braun, V., & Clarke, V. (2021a). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology, 18*(3), 328–352. <https://doi.org/10.1080/14780887.2020.1769238>
- Braun, V., & Clarke, V. (2021b). Can I use TA? Should I use TA? Should I not use TA? Comparing reflexive thematic analysis and other pattern-based qualitative analytic approaches. *Counselling and Psychotherapy Research, 21*(1), 37–47. <https://doi.org/10.1002/CAPR.12360/FORMAT/PDF>
- Braun, V., Clarke, V., & Hayfield, N. (2022). 'A starting point for your journey, not a map': Nikki Hayfield in conversation with Virginia Braun and Victoria Clarke about thematic analysis. *Qualitative Research in Psychology, 19*(2), 425–445. <https://doi.org/10.1080/14780887.2019.1670765>
- Byrne, D. (2021). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality and Quantity, 56*(3), 1391–1412. <https://doi.org/10.1007/s11135-021-01182-y>
- Chan, E. Y. (2019). Mindfulness promotes sustainable tourism: The case of Uluru. *Current Issues in Tourism, 22*(13), 1526–1530. <https://doi.org/10.1080/13683500.2018.1455647>
- Chawla, L. (2020). Childhood nature connection and constructive hope: A review of research on connecting with nature and coping with environmental loss. *People and Nature, 2*(3), 619–642. <https://doi.org/10.1002/pan3.10128>
- Clayton, S., & Karazsia, B. T. (2020). Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology, 69*, 101434. <https://doi.org/10.1016/j.jenvp.2020.101434>
- Condon, P., & Makransky, J. (2020). Recovering the relational starting point of compassion training: A foundation for sustainable and inclusive care. *Perspectives on Psychological Science, 15*(6), 1346–1362. <https://doi.org/10.1177/1745691620922200>
- Deringer, S. A., Hanley, A., Hodges, J., & Griffin, L. K. (2020). Improving ecological behavior in outdoor recreation through mindfulness interventions: A mixed methods inquiry. *Journal of Outdoor Recreation, Education, and Leadership, 12*(2), 149–163. <https://doi.org/10.18666/jorel-2020-v12-i2-9802>
- Dhanda, T. K. (2019). Achieving triple dividend through mindfulness: More sustainable consumption, less unsustainable consumption and more life satisfaction. *Ecological Economics, 161*, 83–90. <https://doi.org/10.1016/j.ecolecon.2019.03.021>
- Di Giulio, A., Fischer, D., Schäfer, M., & Blättel-Mink, B. (2014). Conceptualizing sustainable consumption: Toward an integrative framework. *Sustainability: Science, Practice, and Policy, 10*(1), 45–61. <https://doi.org/10.1080/15487733.2014.11908124>
- Eisenberg, N., VanSchyndel, S. K., & Hofer, C. (2015). The association of maternal socialization in childhood and adolescence with adult offsprings' sympathy/caring. *Developmental Psychology, 51*(1), 7–16. <https://doi.org/10.1037/a0038137>
- Fabjański, M., & Brymer, E. (2017). Enhancing health and wellbeing through immersion in nature: A conceptual perspective combining the stoic and buddhist traditions. *Frontiers in Psychology, 8*(SEP), 1–6. <https://doi.org/10.3389/fpsyg.2017.01573>
- Farrow, K., Grolleau, G., & Ibanez, L. (2017). Social norms and pro-environmental behavior: A review of the evidence. *Ecological Economics, 140*, 1–13. <https://doi.org/10.1016/j.ecolecon.2017.04.017>
- Fischer, D., & Barth, M. (2014). Key competencies for and beyond sustainable consumption: An educational contribution to the debate. *GAIA - Ecological Perspectives for Science and Society, 23*(3), 193–200. <https://doi.org/10.14512/gaia.23.S1.7>
- Fischer, D., Stanzus, L. S., Geiger, S. M., Grossman, P., & Schrader, U. (2017). Mindfulness and sustainable consumption: A systematic literature review of research approaches and findings. *Journal of Cleaner Production, 162*, 544–558. <https://doi.org/10.1016/j.jclepro.2017.06.007>
- Frank, P., Fischer, D., Stanzus, L., Grossman, P., & Schrader, U. (2021). Mindfulness as self-confirmation? An exploratory intervention study on potentials and limitations of mindfulness-based interventions in the context of environmental and sustainability education. *The Journal of Environmental Education, 52*(6), 417–444. <https://doi.org/10.1080/00958964.2021.1966352>
- Frank, P., & Marken, M. (2021). Developments in qualitative mindfulness practice research: A pilot scoping review. *Mindfulness, 13*, 17–36. <https://doi.org/10.1007/s12671-021-01748-9>
- Frank, P., Sundermann, A., & Fischer, D. (2019). How mindfulness training cultivates introspection and competence development for sustainable consumption. *International Journal of Sustainability in Higher Education, 20*(6), 1002–1021. <https://doi.org/10.1108/IJSHE-12-2018-0239>
- Garland, E. L., Farb, N. A., Goldin, R., & P., & Fredrickson, B. L. (2015). Mindfulness broadens awareness and builds eudaimonic meaning: A process model of mindful positive emotion regulation. *Psychological Inquiry, 26*(4), 293–314.

- Gatersleben, B. (2018). Measuring environmental behaviour. In L. Steg, A. van de Berg, & J. I. M. de Groot (Eds.), *Environmental Psychology* (pp. 155–166). John Wiley & Sons. <https://doi.org/10.1002/9781119241072.ch16>
- Geiger, S. M., Fischer, D., Schrader, U., & Grossman, P. (2019a). Meditating for the planet: Effects of a mindfulness-based intervention on sustainable consumption behaviors. *Environment and Behavior*, 52(9), 1012–1042. <https://doi.org/10.1177/0013916519880897>
- Geiger, S. M., Grossman, P., & Schrader, U. (2019b). Mindfulness and sustainability: Correlation or causation? *Current Opinion in Psychology*, 28, 23–27. <https://doi.org/10.1016/j.copsyc.2018.09.010>
- Giacomantonio, M., De Cristofaro, V., Panno, A., et al. (2022). The mindful way out of materialism: Mindfulness mediates the association between regulatory modes and materialism. *Current Psychology*, 41, 3124–3134. <https://doi.org/10.1007/s12144-020-00850-w>
- Gilbert, P. (2014). The origins and nature of compassion focused therapy. *British Journal of Clinical Psychology*, 53(1), 6–41. <https://doi.org/10.1111/bjc.12043>
- Grossman, P. (2010). Mindfulness for psychologists: Paying kind attention to the perceptible. *Mindfulness*, 1(2), 87–97. <https://doi.org/10.1007/s12671-010-0012-7>
- Habito, R. L. F. (2007). Environment or earth sangha: Buddhist perspectives on our global ecological well-being. *Contemporary Buddhism*, 8(2), 131–147. <https://doi.org/10.1080/14639940701636117>
- Hanley, A. W., Warner, A. R., Dehili, V. M., Canto, A. I., & Garland, E. L. (2015). Washing dishes to wash the dishes: Brief instruction in an informal mindfulness practice. *Mindfulness*, 6(5), 1095–1103. <https://doi.org/10.1007/s12671-014-0360-9>
- Harvard Business Review. (2014). Mindfulness in the age of complexity. *Harvard Business Review*, 92(3), 68–73.
- Hayes, S. C., Hofmann, S. G., Stanton, C. E., Carpenter, J. K., Sanford, B. T., Curtiss, J. E., & Ciarrochi, J. (2019). The role of the individual in the coming era of process-based therapy. *Behaviour Research and Therapy*, 117, 40–53. <https://doi.org/10.1016/j.brat.2018.10.005>
- Helm, S., & Subramaniam, B. (2019). Exploring socio-cognitive mindfulness in the context of sustainable consumption. *Sustainability (Switzerland)*, 11(13). <https://doi.org/10.3390/su11133692>
- Hofmann, S. G., Curtiss, J. E., & Hayes, S. C. (2020). Beyond linear mediation: Toward a dynamic network approach to study treatment processes. *Clinical Psychology Review*, 76, 101824. <https://doi.org/10.1016/j.cpr.2020.101824>
- Howard VR (2018) Nonviolence in the dharma traditions: Hinduism, Jainism, and Buddhism. *The Routledge handbook of pacifism and nonviolence* (pp. 80–92). Routledge. <https://doi.org/10.4324/9781315638751>
- Hunecke, M., & Richter, N. (2019). Mindfulness, construction of meaning, and sustainable food consumption. *Mindfulness*, 10(3), 446–458. <https://doi.org/10.1007/s12671-018-0986-0>
- Jacob, J., Jovic, E., & Brinkerhoff, M. B. (2009). Personal and planetary well-being: Mindfulness meditation, pro-environmental behavior and personal quality of life in a survey from the social justice and ecological sustainability movement. *Social Indicators Research*, 93(2), 275–294. <https://doi.org/10.1007/s11205-008-9308-6>
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144–156. <https://doi.org/10.1093/clipsy/bpg016>
- Kasser, T. (2017). Living both well and sustainably: A review of the literature, with some reflections on future research, interventions and policy. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 375(2095), 20160369. <https://doi.org/10.1098/rsta.2016.0369>
- Khoury, B., Knäuper, B., Pagnini, F., Trent, N., Chiesa, A., & Carrière, K. (2017). Embodied mindfulness. *Mindfulness*, 8(5), 1160–1171. <https://doi.org/10.1007/s12671-017-0700-7>
- Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239–260. <https://doi.org/10.1080/13504620220145401>
- Loy, L. S., & Reese, G. (2019). Hype and hope? Mind-body practice predicts pro-environmental engagement through global identity. *Journal of Environmental Psychology*, 66, 101340. <https://doi.org/10.1016/j.jenvp.2019.101340>
- Markowitz, E. M., Slovic, P., Västfjäll, D., & Hodges, S. D. (2013). Compassion fade and the challenge of environmental conservation. *Judgment and Decision Making*, 8(4), 397–406.
- Newton, N. (2010). The use of semi-structured interviews in qualitative research: Strengths and weaknesses. *Exploring Qualitative Methods*, 1(1), 1–11.
- Panno, A., Giacomantonio, M., Carrus, G., Maricchiolo, F., Pirchio, S., & Mannetti, L. (2018). Mindfulness, Pro-environmental behavior, and belief in climate change: The mediating role of social dominance. *Environment and Behavior*, 50(8), 864–888. <https://doi.org/10.1177/0013916517718887>
- Pelletier, L. G. (2002). A motivational analysis of self-determination for pro-environmental behaviors (pp. 205–230). In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination Research*. University of Rochester Press.
- Pelletier, L. G., Baxter, D., & Huta, V. (2011). Personal autonomy and environmental sustainability. In V. I. Chirkov, R. M. Ryan, & K. M. Sheldon (Eds.), *Human Autonomy in Cross-Cultural Context* (Vol. 1, pp. 257–277). Springer. https://doi.org/10.1007/978-90-481-9667-8_12
- Quaglia, J. T., Soisson, A., & Simmer-Brown, J. (2020). Compassion for self versus other: A critical review of compassion training research. *The Journal of Positive Psychology*, 16(5), 675–690. <https://doi.org/10.1080/17439760.2020.1805502>
- Schuman-Olivier, Z., Trombka, M., Lovas, D. A., Brewer, J. A., Vago, D. R., Gawande, R., Dunne, J. P., Lazar, S. W., Loucks, E. B., & Fulwiler, C. (2020). Mindfulness and behavior change. *Harvard Review of Psychiatry*, 28(6), 371–394. <https://doi.org/10.1097/HRP.0000000000000277>
- Sedlmeier, P., & Theumer, J. (2020). Why do people begin to meditate and why do they continue? *Mindfulness*, 11(6), 1527–1545. <https://doi.org/10.1007/s12671020-01367-w>
- Shankland, R., Tessier, D., Strub, L., Gauchet, A., & Baeyens, C. (2020). Improving mental health and well-being through informal mindfulness practices: An intervention study. *Applied Psychology: Health and Well-Being*, 13(1), 63–83. <https://doi.org/10.1111/aphw.12216>
- Shapiro, S., Siegel, R., & Neff, K. D. (2018). *Paradoxes of mindfulness*. *Mindfulness*, 9(6), 1693–1701. <https://doi.org/10.1007/s12671-018-0957-5>
- Stanzus, L. S., Frank, P., & Geiger, S. M. (2019). Healthy eating and sustainable nutrition through mindfulness? Mixed method results of a controlled intervention study. *Appetite*, 141, 104325. <https://doi.org/10.1016/j.appet.2019.104325>
- Thiermann, U. B., & Sheate, W. R. (2020a). Motivating individuals for social transition: The 2-pathway model and experiential strategies for pro-environmental behaviour. *Ecological Economics*, 174, 106668. <https://doi.org/10.1016/j.ecolecon.2020.106668>
- Thiermann, U. B., & Sheate, W. R. (2020b). The way forward in mindfulness and sustainability: A critical review and research agenda. *Journal of Cognitive Enhancement*, 5(1), 118–139. <https://doi.org/10.1007/s41465-020-00180-6>
- Thiermann, U. B., Sheate, W. R., & Vercaemmen, A. (2020). Practice matters: Pro-environmental motivations and diet-related impact vary with meditation experience. *Frontiers in Psychology*, 3577. <https://doi.org/10.3389/fpsyg.2020.584353>

- Tirch, D. D. (2010). Mindfulness as a context for the cultivation of compassion. *International Journal of Cognitive Therapy*, 3(2), 113–123. <https://doi.org/10.1521/ijct.2010.3.2.113>
- Van Dam, N. T., van Vugt, M. K., Vago, D. R., Schmalzl, L., Saron, C. D., Olendzki, A., Meissner, T., Lazar, S. W., Kerr, C. E., Gorchov, J., Fox, K. C. R., Field, B. A., Britton, W. B., Brefczynski-Lewis, J. A., & Meyer, D. E. (2018). Mind the hype: A critical evaluation and prescriptive agenda for research on mindfulness and meditation. *Perspectives on Psychological Science*, 13(1), 36–61. <https://doi.org/10.1177/1745691617709589>
- Venhoeven, L. A., Bolderdijk, J. W., & Steg, L. (2016). Why acting environmentally-friendly feels good: Exploring the role of self-image. *Frontiers in Psychology*, 7, 1846. <https://doi.org/10.3389/fpsyg.2016.01846>
- Wamsler, C., & Brink, E. (2018). Mindsets for sustainability: Exploring the link between mindfulness and sustainable climate adaptation. *Ecological Economics*, 151, 55–61. <https://doi.org/10.1016/j.ecolecon.2018.04.029>
- Werner, A., Spiller, A., & Meyerding, S. G. H. (2020). The yoga of sustainable diets : Exploring consumers mind and spirit. *Journal of Cleaner Production*, 243, 118473. <https://doi.org/10.1016/j.jclepro.2019.118473>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.