Education for Sustainable Consumption through Mindfulness Training: Conceptualization and Results of an Intervention Study

vorgelegt von
MSc in CSR
Laura Sophie Stanszus

an der Fakultät I - Geistes- und Bildungswissenschaften
der Technischen Universität Berlin
zur Erlangung des akademischen Grades

Doktor der Geisteswissenschaften
- Dr. -phil. –

genehmigte Dissertation

Promotionsausschuss:

Vorsitz: Prof. Dr. Stefan Weinzierl
Gutachter: Prof. Dr. Ulf Schrader
Gutachter: Prof. Dr. Daniel Fischer
Gutachterin: Prof. Dr. Nina Langen

Tag der wissenschaftlichen Aussprache: 18.09.2019

Berlin 2020
Table of contents

List of individual papers with abbreviations .............................................................. 2
Framework text .................................................................................................................. 3
1 Introduction ..................................................................................................................... 3
2 Conceptual framework .................................................................................................. 4
   2.1 Education for sustainable consumption ................................................................. 4
   2.2 The concept of mindfulness ...................................................................................... 6
   2.3 Potential of mindfulness training for (education for) sustainable consumption and beyond .......................................................... 9
3 Presentation of individual papers .................................................................................. 11
   3.1 Summaries and author contributions ....................................................................... 11
   3.2 Research approaches and applied methods .............................................................. 14
4 Contributions ............................................................................................................... 16
   4.1 Main findings ............................................................................................................ 17
   4.2 Limitations and recommendations for future research ............................................. 27
5 Conclusion & Outlook .................................................................................................. 28
6 References ..................................................................................................................... 31
Appendix 1: Overview of individual papers and author contributions ......................... 38
Appendix 2: Individual papers ......................................................................................... 39


List of individual papers with abbreviations


Framework text

1 Introduction

It is understood amongst research and policy makers that addressing unsustainable individual consumption patterns is key for successful sustainable development (Alfredsson et al., 2018, Rieckmann, 2018). Despite this knowledge and an increasing awareness about this fact in the general population, little has been achieved to substantially change behavioral patterns so far (Alfredsson et al., 2018). Since the UN decade “Education for sustainable consumption” (2005-2014) and the ensuing post-2015 agenda with the Sustainable Development Goals (SDGs), where both education for sustainable development (ESD) and sustainable consumption (SC) are prominently addressed (goals number 4 and 12), a reorientation of ESD/ESC (education for sustainable consumption) has taken place to account for the stagnating process. ESC scholars and ESC researchers alike have called for a departure from simply pursuing behavioral change as the main learning objective and a shift to primarily focusing on the development of key competencies for sustainable consumption (Fischer & Barth, 2014; Rieckmann, Mindt & Gardiner, 2017). These competencies ought to empower the learner to actively and self-responsibly contribute to societal progress towards sustainability; this is different than merely engaging with cognitively based knowledge, which often does not influence actual behavior (ibid.). The development of competencies also engages individual predispositions and personal resources in a way that so far has been neglected in favor of broad, cognitive centered approaches.

The concept of mindfulness has been recently discussed in relation to supporting, in particular, emotional-motivational, competencies for SC. Mindfulness, originating in centuries-old Buddhist practices, is defined here as “the unbiased awareness that emerges through intentionally and continuously paying attention to subjective momentary experience with an open, accepting, benevolent, and compassionate attitude” (Boehme et al., 2016, p. 6). The practice, as increasingly investigated by modern science, has been shown to train awareness of one’s everyday behavioral patterns (Chambers et al., 2009). This includes habitual consumption patterns that have become automatic over time and thus difficult to change, despite a general willingness to do so. The potential access gained through mindfulness practice to those cognitive-behavioral processes that underlie consumption theoretically allows for more deliberate choices (Rosenberg, 2004). Other scholars conclude that “mindful attentiveness” (p. 1, Amel et. al., 2009) might be a prerequisite for intrinsically motivated sustainable behavior. A strengthening of non-materialistic values through the training of mindfulness and
consequently a reduced desire to consume was proposed by Ericson et al. (2014) in the context of a comprehensive theoretical argument regarding how the practice of mindfulness could change people’s consumption patterns.

Despite the increasing number of conceptual works about the nexus between mindfulness and SC, qualitatively sound intervention studies to test the effects of mindfulness on consumption behaviors were nonexistent six years ago – at the inception of this thesis research process – and remain scarce (JoCP, 2017).

This dissertation examines the conceptualization process of an intervention study on the potential effects of mindfulness training on SC behavior and its value for ESC. Furthermore it gives an account of navigating this newly created research field through the development of a consumption-specific mindfulness training and a detailed description of the process of evaluating and analyzing empirical data as part of the larger research project BiNKA. Results for two different target groups are elaborated. Against the background of the five individual papers associated with this dissertation and their different foci, the overarching goal of this research is to explore the potential of mindfulness to further ESC.

The framework text in section 2 provides an overview of the broader research context, before presenting the individual papers with short summaries including individual author contributions. Section 3 will elaborate on the different research approaches applied and the methods used. Each article’s main contributions will be discussed in section 4, alongside limitations and recommendations for future research in the field. Section 5 concludes the framework text by discussing the value of mindfulness for furthering (E)SC.

2 Conceptual framework

2.1 Education for sustainable consumption

The unique role of education in forwarding sustainable development was acknowledged as early as 1977 at the world’s first intergovernmental conference by the UNESCO and the United Nations Environment Programme (UNEP) on environmental education in Tbilisi, Georgia (Leicht et. al, 2018). The goals formulated at the conference went beyond ecological aspects to include development of a “clear awareness of, and concern about, economic, social, political,
and ecological interdependence in urban and rural areas” (UNESCO-UNEP, 1977, point 3, as cited in ibid.), which remains a foundation of ESD today.

The UN decade (2005-2014) further highlighted the importance of ESD, as did a statement of the UNESCO at the 2012 SD summit: “Achieving sustainable development requires a change in the way we think and act, and consequently a transition to sustainable lifestyles, consumption and production patterns. Only education and learning at all levels and in all social contexts can bring about this critical change” (UNESCO 2012a, p.13, emphasis added). The initiation of the Sustainable Development Goals post 2015 included an anchoring of educational aspects in every goal and a call for new, transformative learning approaches as well as acknowledging the need for a radical change in how education is delivered and perceived worldwide (UNESCO, 2016). It furthermore underlined the prominence of ESD and SC by addressing distinct SDGs (numbers 4 and 12) for the topics.

ESC as a field of scholarship, policy and educational practice aims at connecting the discourses around consumer education, ESD and SC (Adomßent et al. 2014).

Sustainable consumption behaviors are defined here based on the cube model by Geiger, Fischer and Schrader (2017) as “individual acts of satisfying needs in different areas of life by acquiring, using and disposing goods and services that do not compromise the ecological and socioeconomic conditions of all people (currently living or in the future) to satisfy their own needs.” (p.3).

Over the last two decades the focus of ESC has been – and still is – shifting gradually from cognitive based knowledge input orientation to an outcome-based competence approach (Adomßent & Hoffmann, 2013). In Germany, from early on, a number of key-competencies were identified and summarized under the term “Gestaltungskompetenz” (shaping competence) (Transfer 21, 2007), which were seen as a prerequisite for a successful ESD and especially ESC (Fischer & Barth, 2014).

Apart from the status quo and increasing development of unsustainable consumption levels in the modern world, the development of Gestaltungskompetenz is gaining in importance because of another phenomena: ordinary, day-to-day consumption patterns in highly developed countries, such as Germany, are largely habitualized and thus mostly unconscious (Tully & Krok, 2009). Any attempt at changing and transforming individual consumption behavior is hindered as a consequence, even though essentially important for SC. To support consumers in developing, for example, self-reflection capacities (one of the main
“Gestaltungskompetenzen”) concerning their own and their cultures consumption patterns and lifestyles is consequently a key goal for forwarding SC. The relevance of increasing the ability to reflect on one’s own unconscious consumption patterns is also shown by the fact that the rise in environmental awareness in the general population in the last decade has so far not been matched by measurable behavioral changes in consumption (“attitude-behavior-gap”, see a.o. Auger & Devinney, 2007; Kleinhückelkotten et al., 2016; Alfredsson et al., 2018).

Furthermore, the competence to reflect on and become aware of personal behavior, including individual values and norms, paves the way for becoming able to reflect on modern cultural norms and value systems (UNESCO, 2017), enabling people to proactively contribute to a transformation of these current structures (Rieckmann, 2018a).

The focus has thus shifted from promoting certain behaviors and ways of thinking to an “emancipatory concept” (ibid., p.41) of education that develops the skills and competencies necessary to participate pro-actively in moving SC and SD forward on a societal level.

However, despite this promising outlook, the practical implementation so far has been and still is far from a holistic approach to supporting competency building. The discourse has predominantly evolved around discursive-intellectual approaches (Frank & Stanszus, 2019), despite evidence of the importance of individual emotional factors in every stage of consumption (Hamann, 2016) and reports that a lack of affective-motivational competence can even have adverse effects on morally laden topics such as SC (Tenbrunsel & Messick, 2004).

A deeper engagement with affective-motivational processes in ESC is hence called for (Brundiers & Wiek, 2017; UNESCO, 2017). Educational settings that address both cognitive and affective-motivational learning outcomes and in consequence forward a reflexive, personal engagement with SC challenges are needed to accelerate much needed progress in the realms of (E)SC.

2.2 The concept of mindfulness

Mindfulness has been discussed for its potential to help with that acceleration. To define mindfulness has proven difficult in the current scientific, clinical and general societal discourses due to a diversity in origin (Grossman, 2010) and fields of application. One set of definitions has been derived from Buddhist philosophy and psychology (Chiesa, 2013; Grossman, 2010 and 2015; Kabat-Zinn, 2003), while another, with a more cognitive psychological orientation, was adapted more recently (Langer & Moldoveanu, 2000). The two areas overlap in their conceptualizations.
However, stopping at the cognitive psychological definitions that involve effects of a state or mindfulness trait on the brain, behavior or stress-response, would fall short of the manifold aspects inherent in the centuries-old depictions of mindfulness in traditional Buddhism. Langer and Moldoveanu (2000), as representatives of the earliest cognitive psychological orientation, define mindfulness as actively drawing “novel distinctions” (p.1). They claim that whether the matter noticed is important or trivial is not important, if it is perceived as new, in the present moment. In that way, awareness increases about the context of and gives perspectives on our behavior. This in turn allows us to step away from habitualized routines and rules that do not take the current situation into account and instead rely on distinctions and categories drawn in the past. Consequences of such mindful focus include, according to the authors, a rise in sensitivity to the environment, an increased capacity to process new information and an opening for multiple perspectives, for example, in problem solving. Mindfulness practice in the form of meditation or contemplative practices are not mentioned here.

In Buddhist psychology, as well as in modern contexts that adapt the traditional understanding, mindfulness is described as a “systematic phenomenological program to investigate subjective experience” (Grossman, 2011, p. 1). At the same time, ethical attitudes and behaviors oriented toward benevolent relations to the animate and inanimate world are said to be cultivated (Grossman, 2015). The practice of mindfulness might thus be seen as an important means by which human tendencies toward greediness, aversion and delusional thinking can be counteracted (ibid.). To foster this kind of mindfulness, a variety of practices can be used to systematically train awareness and emotional (non-) reactivity as well as enhance awareness of internal processes such as thoughts, emotions and bodily sensations (Bishop et al., 2004; Chiesa & Malinowski, 2011). Despite its seemingly central role in Buddhist traditions, ancient Buddhist texts explicate mindfulness as only one aspect of eight in the “Noble Eightfold Path”. Every practicing Buddhist on the path to enlightenment is invited to practice the “right” (for the Buddhist ethical understanding) (i) view, (ii) resolve, (iii) speech, (iv) conduct, (v) livelihood, (vi) effort, (vii) mindfulness and (viii) concentration (Bodhi, 2013). Furthermore, those practices are to be grounded in mindful conduct with one’s body, emotions, consciousness and thoughts (ibid.).

The difference in depth of background and conceptual complexity between these two perspectives (cognitive psychological vs. Buddhist traditional) on mindfulness, although only
briefly described here, is readily apparent. However, the differentiation between the two definitions of mindfulness does not seem to be as easy to grasp, let alone apply correctly, in more recent applications of mindfulness-based interventions, trainings and general research:

In the last two decades, research on the concept of mindfulness has shown nearly exponential growth. From 10 publications found in 2000, the numbers have grown by a factor of 81 to 842 journal publications alone in 2018 (see Figure 1).

Consequently, alongside this growth spurt, critical voices have been on the rise concerning the multitude of confusing definitions and concepts, overly positive and simplified statements about the effects of mindfulness training, and serious methodological flaws in the related research (Grossman, 2011; 2015; Fischer et al., 2017; Goldberg et al., 2017; Van Dam et al. 2018). Furthermore, some researchers claim that the explicit uprooting or dissociation of mindfulness practice from the ethical and educational foundation of Buddhist mindfulness, recently labeled “McMindfulness” (Hyland, 2017), endangers any possible individual or societal benefit from introducing the practice into contemporary life (Purser, 2019; Forbes, 2019).

Meanwhile, research on the concept of mindfulness and the effects of training have been investigated in a variety of fields. Originating in clinical research (Kabat-Zinn et al., 1992; Bowen et al., 2006), research has spread to different (psycho-)therapeutic areas (Germer et al., 2016), to educational settings, ranging from pre-school to university (Zenner et al., 2014), to economics, especially concerning performance enhancement and stress management (Ie et al., 2014) and even into the military (Jha et al., 2015). With the numbers of projects and publications rising, several literature reviews and meta-analyses have summarized the growing field of evidence from the individual studies. A variety of positive effects of mindfulness training have been found; for example, on health and well-being (Black & Slavich, 2016; Goyal et al., 2014),

![Figure 1 Mindfulness journal publications by year, 1980-2018](https://goamra.org/resources/)
emotion regulation (Hill & Updegraff, 2012), attention and cognitive performance (Eberth and Sedlmeier, 2012) as well as, more recently, compassion and prosocial behaviors (Luberto et al., 2017). The reported positive effects should be cautiously received, however, considering the critical voices that challenge the neutrality of the studies and researchers, as well as the replicability of findings (Van Dam et al., 2018), alongside the other rather problematic issues surrounding the expanding research field.

This thesis – and the larger BiNKA project – explicitly incorporate in their concept of mindfulness the ethical qualities inherent in the traditional Buddhist understanding, thus clarifying their position in the ongoing critical discussion. Mindfulness is thus described as “the unbiased awareness that emerges through intentionally and continuously paying attention to subjective momentary experience with an open, accepting, benevolent, and compassionate attitude” (Boehme et al., 2016, p. 6).

In the following section the theoretical potential of mindfulness for (E)SC will be briefly introduced, before presenting the individual papers and their contributions to the exploration of this potential as well as the empirical results in chapter 3.

2.3 Potential of mindfulness training for (education for) sustainable consumption and beyond

As discussed in the previous sections, a more practically relevant and thus “successful” ESC needs a deeper engagement with affective-motivational processes, alongside the dominant cognitive approaches. A deeper reflexive engagement with the challenges of SC might be supported by the inclusion of mindfulness-based-practices in ESC for several reasons. In general, practicing mindfulness might bring cognition and affection closer together. Through the deliberate and conscious focusing on the present moment that characterize the concept (Brown & Ryan, 2003; Kabat-Zinn, 2003), a greater awareness of thoughts, emotions and one’s reaction to stimuli arises. The systematic training of individual and, at a more advanced level, collective awareness and emotional (non-)reactivity, might allow for more deliberate choices in general and in consumption situations in particular (Rosenberg, 2004). Two pilot studies have shown that susceptibility to certain marketing techniques and means of persuasion decreases through the cultivation of mindfulness (Pollock et al., 1998; Dong & Brunel, 2006). In one of the earliest conceptual works around mindfulness and its potential for SC, Rosenberg (2004) described another important aspect. Again, through enhanced awareness, individuals may feel a deeper sense of interconnectedness with the world and fellow humans, leading to a genuine non-consumerist satisfaction of the need for fulfillment in life. Furthermore, as
mentioned before and according to the traditional understanding of mindfulness, its cultivation is intrinsically tied to the development of ethical intentions and attitudes towards one’s self and others (Grossman, 2015). Kindness, compassion, generosity and equanimity, as the antidote to the aforementioned human tendencies toward greediness, aversion and delusional thinking may emerge with the practice, all supporting a way of consumption more aligned with the concept of SC. The strengthening of non-materialistic values and consequently a decreasing level of consumption was brought forward as another important mechanism of mindfulness for SC in Ericson et al.'s (2014) comprehensive account of how mindfulness could change our consumption patterns.

The compilation and analysis of mechanisms of mindfulness that might potentially support (E)SC is one of the goals of this thesis. A further elaboration will be presented in the findings section.

This chapter concludes with a broader stance on the potential and necessity to include more self-reflective practices, such as mindfulness, and thus more individual aspects into ESC and ESD.

One thing becomes apparent when the perspective is broadened from the need to develop a more holistic approach in educational settings which goes beyond the facilitation of cognitive knowledge to include the whole discourse around (education for) sustainable development. So far, primarily the collective side and not the individual side of the apparent problems humanity is facing has been addressed. Far beyond the field of education, in the political and scientific spheres, as well in the wider discussions about technological solutions to climate change or adaptations of economic mechanisms, the focus remains on the macro and meso levels, mostly excluding the micro level (Parodi & Tamm, 2018). Because of this, earth systems, climate change in general, the flow of global goods and commodities, and at the regional level agricultural systems and sustainable lifestyles have been getting most of the attention (ibid.). This is not to say that the individual responsibility of consumers has not been stressed nor that the need for change from the bottom up has been ignored. However, individual, intra- and interpersonal aspects that make up the deeper layers of the micro level have rarely been addressed. Consequently, the internal world of the “conscious and acting subject of sustainable development, the human being” (Parodi & Tamm, p. 2), has not been sufficiently included. Individual ways of making sense of the world, such as processes of perception, awareness and relating, the influence of emotions on our behavior, our psychic health and general experience of life, are accordingly not adequately considered in the efforts towards SD or SC (Frank &
Stanszus, 2019). The introspective practice of mindfulness may be a way to start engaging the individual in a more personal way.

In the following, the five papers constituting this thesis will be presented in summary, alongside individual author contributions, before discussing their respective research approaches and methods.

3 Presentation of individual papers
This section provides brief summaries of each of the five papers constituting this thesis, as well as individual author contributions (3.1). In 3.2, the individual papers are presented in the context of the conceptual framework of the dissertation, followed by their research approaches and applied methods.

3.1 Summaries and author contributions
(1) The Systematic Literature Review (SLR) on the nexus of mindfulness and sustainable consumption was the first publication of this dissertation (JoCP). It aimed at supporting the consolidation of the field of research, scattered across multiple disciplines, on the connection between mindfulness and consumption. In a stocktaking exercise, the authors gathered an initial sample of N=1137 publications dealing with the aforementioned connection, and empirically and systematically evaluated them based on their research methodologies and reported findings. A focus of the review was placed on four potential mechanisms of mindfulness for sustainable consumption which have been postulated in seminal conceptual works in the field.

The SLR was a joint work between Daniel Fischer (DF), lead author from Leuphana University, and Laura Stanszus (LS), second contributing author (as well as the other co-authors with lesser parts). The conceptualization of the paper and especially the strategy for the literature review was developed jointly; the key-word-string was proposed by DF. Data curation was done by both DF and LS in equal parts; formal analysis, thus screening of databases, sorting and evaluating as well as preparation of the final sample was largely executed and directed by LS. Visualization of results was mainly done by DF, as well as supervision of the whole process. The original structure for the draft was created by DF; LS wrote and later reviewed the first drafts of chapter 2.1 and 2.2 as well as 3 and all passages in chapter 4 and 5 related to the qualitative studies under evaluation (Sonja Geiger (SG) did the same for all quantitative parts). Chapter 6 was drafted by DF with input from all co-authors. After the internal review process, LS edited the chapters she originally wrote and did so again after the external review process. For the final editing, DF revised the whole manuscript and specifically asked for certain aspects
to be edited by his co-authors. In the long process of different reviews, all authors discussed and reviewed collaboratively each other’s passages. The paper has been published in the Journal of Cleaner Production in 2017.

(2) The second paper (JTES) focused on the development of a consumption specific mindfulness intervention, applied and carried out in the BiNKA-project. The reflexive case study, underlined by the findings from the SLR concerning methodological shortcomings, detailed the process of the interventions development and its influencing factors to enhance transparency and traceability of the intervention study.

In this paper LS was lead author, who coordinated contributions and input from the rest of the team of co-authors. She structured the article, wrote the first draft incorporating parts provided by some of the co-authors and edited those parts to fit into the whole. She was also the lead for visualizations. Specifically, DF contributed to the part about ESC and its status quo in research and praxis (p.6-7). Tina Boehme (TB) wrote the original draft of the section “Result: The BiNKA Curriculum” (p. 13), as well as all sections that elaborate on the school training throughout the article. While the co-authors provided critical review and editing suggestions in multiple rounds, LS did most of the editing after the internal reviews. TB supported the editing process of the critical reflections and especially the lessons learnt sections. Final editing was carried out by DF. As the paper was written after invitation from the journal, there was no external reviewer process and the article was published in the journal of Teacher Education for Sustainability in 2017.

(3) The third paper (MIFU) dealt with an empirical comparison between four qualitative methodological approaches applied in the BiNKA- project (Content Analysis, Grounded Theory, Interpretative Phenomenological Analysis, Discourse Analysis). Arising out of the in-depth assessment of different qualitative methodological approaches to the research data and their particular strengths and weaknesses, we decided to choose those four approaches to be applied independently on the interview data. This approach allowed for a cross-fertilizing of different qualitative perspectives, which is elaborated upon in the paper.

The paper was led by Pascal Frank (PF), based on a conception of the research approach that was a collaborative development between PF and LS, as they were also both developing and applying the methods for the study at hand. The detailed comparison and analysis of the specifics of each method was also a joint work between PF and LS, as was the data gathering, analysis and interpretation. At this point, Klara Kehnel (KK) contributed her analysis of the Interpretive Phenomenological Analysis. PF structured the article and coordinated
contributions. LS wrote the first draft of chapter 3.1, 3.2 and 3.3.1 as well as 4.1. She contributed to the structure of the other sections through initial sketching with PF. LS also reviewed and edited the complete first draft after all contributions were put together and continuously edited after feedback rounds from the other authors. The paper was conditionally accepted by the Mindfulness Journal and has been resubmitted following amendments in June 2019.

(4) The fourth paper was the main empirical contribution to this dissertation (A). Reporting both quantitative and qualitative results (Mixed-Methods approach) of the BiNKA intervention, the article focused specifically on the effects of the mindfulness training on nutritional behavior in the student population of the study. Highlighting the existing research on mindfulness as an efficient means to improve healthy nutrition, the research investigated potential effects on sustainable nutritional habits through the BiNKA training.

LS was the leading author and project administrator for this paper, while the conceptualization was shared with Sonja Geiger (SG). PF and LS conducted the investigation of the qualitative part of the study as well as developing the methodology and data curation prior to the realization of the article. The specific formal qualitative data analysis for the research questions of the paper as well as the crafting of the Mixed-Method approach and the structuring of the article was done by LS. SG was responsible for the investigation, methodology and analysis of the quantitative data and provided the original draft of both the methods and result sections for the quantitative part of the study. She also provided critical review for the first draft prepared by LS. PF provided critical review in the final stages of the paper as well as working on the revision after internal review. The paper was published in the Appetite Journal in June 2019.

(5) The fifth paper of this dissertation also reports on results of the project, specifically mixed-method results for the school cohort (S). The question whether mindfulness training at school can engage adolescents with sustainable consumption was at the core of the article. The development of new approaches that engage adolescents with sustainable consumption which include not only the cognitive but also the socio-emotional and behavioral levels is a central challenge in ESC. The authors propose mindfulness-based Interventions (MBIs) as a potential leverage for learning processes in ESC and describe the BiNKA-project and the specificities adapted for the school intervention, alongside effects of the intervention.

The conceptualization of this paper’s research approach was largely based on the work LS and later LS and PF had done for the larger qualitative study in the BiNKA-project. TB developed a slightly adapted version of the methodology in coordination and supported by LS. Data
The groundwork was laid with the extensive SLR done in preparation for the JoCP paper. Because the concept of mindfulness as a tool for ESC or ESD is relatively new and had not been included in specific ESC intervention studies, the SLR was a crucial first step in providing an overview of this young and scattered research field and the methodologies and results that already exist across disciplines. It furthermore enabled us to get a meta-perspective of the field and orient our own research path according to our analysis of the shortcomings and limitations of previous work. The starting point of our review was a database search in SCOPUS, a major reference database for peer-reviewed journal articles, and ProQuest Dissertations & Theses A&I, a source for potentially relevant PhD dissertations. As our aim was to explore a wide field, the search string used was deliberatively broad in scope, aiming to also identify literature that

**Figure 2: Research approaches and applied methods**

The five papers are in equal parts based on conceptual and empirical contributions, researched through different methodological lenses, as can be seen in Figure 2.
might not have explicitly employed the terminology “mindfulness” and “sustainable consumption”. The semantic fields covered were mindfulness, sustainability and consumption. Within the last two terms, several related terms were included. All literature retrieved (N=1137) underwent a detailed screening of title and abstract against two formal and two content related criteria (for example, the publication had to be informed by an elaborate understanding of mindfulness and focused on a least one aspect of sustainable consumption). The evolving preliminary sample (n=32) underwent a second, in-depth screening, where the full texts were checked by the team against inclusion/exclusion criteria. The resulting pre-final sample helped to identify further relevant publications through supplementary searches done by hand. From the 258 publications identified through the supplementary search, 12 publications entered the preliminary sample. The final sample (n=7) was submitted for a review to two senior researchers in the field, one from sustainability science and one from the mindfulness research field. They were asked to complement the selection with other relevant publications not yet identified. No further results were included. The analysis thus focused on the seven publications in the final sample.

The reflexive case study about the development of the consumption specific mindfulness training (JTES) incorporated our review of existing MBIs, their potential fit for the BiNKA project and, on the other hand, existing ESC methods and approaches that could be adapted to fit the MBI. The paper made transparent and reflected on the development process through this reflexive case study method. It offers interested readers an important support for the development of other specific or adapted MBIs. The value of the paper also lies in inspiring potential multiplicators.

The MIFU paper empirically explored four different qualitative methods (Content analysis, Discourse Analysis, Grounded Theory and Interpretative Phenomenological Analysis), applied to the qualitative interview data from the BiNKA-project. The thorough assessment of different qualitative methods applicable to this explorative qualitative study led to an in-depth comparison of different aspects of mindfulness elucidated by the different methods. It furthermore allowed for an evaluation of each method’s strengths and weaknesses alongside the data concerning their application in specific MBIs studies. This clearly showed the value of cross-fertilizing approaches in the field of such complex concepts as mindfulness.

Both papers with empirical results (A & S) were focused on specifics instead of general results of the consumption-specific MBI. The A paper, on the one hand, reported the effects of the MBI on nutritional behavior in the student cohort, based on both the quantitative survey conducted
and the analysis of the qualitative interviews. A more holistic, Mixed-Methods model was developed through partly integrating both methods: on the level of the research model, through common research questions; on the level of data analysis, through deductive and inductive development of categories; and on the level of effects of the intervention, by consolidating the results of both approaches (see Figure 3).

The S paper, on the other hand discussed the results of the school cohort, based on the same Mixed-Methods approach with slight adaptations on the sample level (not a sequential, but a purely random sample selection).

4 Contributions

Figure 4 gives an overview of the positioning of the five articles in the broader conceptual framework of the thesis. The figure shows that the individual papers address diverse aspects of this dissertation’s context. By focusing on different areas, all within the sphere of the three focus topics, they are able to provide broad, yet detailed contributions to the overarching goal of fostering education and implementation of sustainable consumption. In the following, central
findings from each individual paper will be presented and discussed. Beyond the main findings, current limitations and shortcomings of the research and the broader field are introduced.

4.1 Main findings
Figure 5 provides a summary and overview of main findings as well as the papers’ contribution to the overarching goal of the thesis.

As previously indicated, the consolidation of the research field on the nexus between ESC, SC and mindfulness was the essential first step in orienting all further steps of. The JoCP paper’s first contribution was thus an empirical validation of the relevance of pursuing research into the potential connection between mindfulness and ESC further. The results of this foundational article include both methods used and their quality as well as the studies’ empirical results. On a general level, the first result of the review is that only seven of the 1,137 publications we analyzed met our inclusion criteria for content and are, by our definition, empirical studies on SC and mindfulness.

On a methodological level, this final sample of seven publications exhibited serious challenges and shortcomings in their empirical approaches. Starting from definitional issues, such as varied definitions of both the concept of mindfulness and sustainable consumption, the problems include the development and use of instruments, as well as sample selections that were, more often than not, samples of convenience taken from populations with a sustainability bias that was not accounted for with a grouping variable (in five of the six quantitative publications as well as the qualitative ones). Furthermore, study designs mostly collected (in all but two
quantitative studies and one qualitative study) levels of mindfulness and sustainable consumption at a single point in time only, instead of measuring changes over two or more observation points.

On an empirical level, the seven publications were analyzed alongside four potentially supportive mechanisms of mindfulness for sustainable consumption. Aspects of those “mode of actions” had been previously discussed and proposed in seminal conceptual works in the field and were gathered/synthesized by the authors (see Figure 6) as part of the work in the JoCP paper in order to gain an overview of existing work on the nexus of those topics. The description of the four identified mechanisms can be deemed another contribution of the paper. The four potential mechanisms have been referred to throughout following publications by the research team and beyond. They have also been adapted and further detailed (into five mechanisms) by Geiger, Grossmann and Schrader (2019), as well as other work of this thesis (see A paper).

(1) Disruption of routines or switching off the autopilot is a key and broadly agreed upon effect of mindfulness practice (Grossman et al., 2004) – concerning SC this might decrease unconscious and potentially unsustainable consumption habits.

(2) Self-perceived inattention to everyday experiences is associated with a widening of the attitude-behavior gap (Ruffaul et al., 2016; Chatzisarantis & Hagger, 2007). Enhanced awareness of those immediate daily experiences, as trained through mindfulness, may narrow the gap, leading to more congruence between high sustainability related attitudes and intentions and associated behaviors (Eurobarometer, 2014).

(3) Non-material values and wellbeing may both be increased through the practice of mindfulness. Ericson et al. (2014) propose that mindfulness may be conducive to clarification of values and support the role of intrinsic and socially oriented values in people’s lives (see also Kasser et al., 2014) and decrease the importance of material values (Burroughs & Rindfleisch, 2002).

(4) Pro-social behaviors are increased through meditation practices (Lim, Condon, & DeSteno, 2015; Leiberg et al., 2011). According to Buddhist psychology this is consistent with (3), due to the counteracting effect mindfulness has on the three “unwholesome” qualities common in
human attitudes and behavior: greed, delusion and aversion (Grossman, 2015). Especially other-oriented meditation techniques, such as loving-kindness meditation, have been shown to increase compassion (Condon et al., 2013) and pro-social behaviors (Leiberg et al., 2011). Compassion and thus pro-social behaviors have in turn been shown to be positively linked to pro-environmental intentions (Pfattheicher et al., 2015).

Preliminary evidence to support the four potential mechanisms was found in the publications of the final sample. For example, concerning (1), it was found in two studies that mindfulness disrupts and decreases compulsive consumption pattern. Changes in congruence (2) were mentioned in two studies, with a reported greater likelihood to engage in behavior aligned with one’s own attitudes. For the potential mechanism of supporting non-materialistic values and wellbeing, all but one study reported positive effects; for example, the negative relationship between mindfulness and material values. Improvements in pro-social behavior (4) were discussed in two studies, where a rise in reported (self-)empathy was measured as well as social concern for others.

However, overall, the serious shortcomings on the methodological side outweigh the preliminary evidence and point to the immense importance of improving study design quality and methodological thoroughness. In order to integrate mindfulness in more broadly integrative approaches to SC research, we suggested the use of more longitudinal intervention studies (given that mindfulness develops slowly, over time) with at least a pre-/post-evaluation, more diverse population samples and, ideally, Mixed-Methods approaches, in order to provide as holistic a picture of this complex field as possible (see limitations section for further discussion).

Having laid the foundation, the second paper (JTES) elaborated on the design process of the BiNKA-training. The reflexive character of the case study allowed for a transparent and detailed presentation of the development of the trainings, which is in itself a contribution to the furtherment of the field. As mentioned before, an increasing number of MBIs are being adapted for differing contexts. Through openly sharing our process and critically reflecting on it, building blocks for future interventions and lessons learned from our challenges are made available for use to interested researchers and practitioners. This approach of encouraging use and adaption of our work was explicitly aimed at in order to further the dissemination and discussion of mindfulness as a potential support for ESC.

After bringing together our reviews of existing MBIs, their potential fit for the BiNKA project, and existing ESC methods and approaches that could be adapted to fit into the MBI, the paper
explained the challenge of striking a balance between the mindfulness elements on the one hand and the ESC elements on the other. It revealed the difficulty, likely faced by most developers of MBIs, of staying too close to a pure MBI and thus minimizing potential impact on participants’ consumption-related attitudes and behaviors. However, it also made clear that by adapting the course too much towards ESC formats expected benefits of mindfulness practice might not develop. The importance of a neutral stance towards SC – not to frame it as the “better” way of consuming to avoid confounding extrinsic normative ideas with intrinsic motivations of participants – was seen as essential by the interdisciplinary team. In consequence, it was decided to limit the conveyance of ESC elements to a minimum. A further contribution that the paper makes consists in sharing the teams experience in testing and adapting the training, especially regarding the major changes for the application in school settings, which is valuable for researchers in this field. The topics of each of the eight sessions are given to provide a comprehensive overview:

1. Introduction - What is Mindfulness?
2. Obstacles and Challenges in Meditation
3. (Dis-)Satisfaction and Other Similarities
4. Emotional Intelligence - Be Mindful with what You Feel
5. Desires and Needs - Open Up towards Life
6. Compassion - Kindness towards Myself and Others
7. Mindful Consumption - To Have and to Be
8. A Mindful World - Inside Out

Further adaptions are explained in more detail to provide thorough insight. A detailed process description of session 7, which has the strongest consumption-focus, is also given in the paper. The publication closes with a critical reflection and two major lessons learnt for the future adaption of MBIs within the framework of ESC:

“(1) emphasis should be laid on practices that stimulate participants’ engagement with their inner affective processes and help to elucidate these and make them accessible for reflection (e.g. through self-discovery and openly turning to individual ethical values, needs and behavioral patterns) rather than on external cognitive input; (2) for mindfulness practices to
unfold their full and long-lasting potential for ESC, continuous practice and re-examination of consumption-related processes and experiences rather than a one-shot intervention are required” (JTES, 2017, p.15).

The exploration of differing findings in four different qualitative methods in the MIFU paper was a contribution to the discussion around the evaluation of mindfulness as a concept. The tremendous growth of interest in mindfulness research across disciplines in the last decade has led, not surprisingly and as mentioned before, to an increase in critical voices, too. In particular the application of quantitative measures, which includes most studies to date, has been seriously criticized by different scholars (Van Dam et al. 2018, Grossman, 2008; 2011). The complexity of the concept and relatedly that the practice is perceived very differently from one person to the other make standardized quantitative approaches difficult. Single qualitative approaches have been increasing as an answer to the critics. However, as presented in the MIFU paper, the application of a single qualitative method is not sufficient to display the multitude of potential effects of mindfulness practice. The article contributes to the clarification of the field by comparing the differences in findings of four widely used qualitative methods (Content Analysis, Grounded Theory, Interpretative Phenomenological Analysis, Discourse Analysis) while remaining aware of the potential methodological perspective biases (Deady, 2011) applicable to qualitative approaches. It also contributes simply by reflecting on the different methodological perspectives, as such reflections remain scarce in current qualitative mindfulness research (Malpass et al., 2011).

Without here providing a detailed account of the characteristics of each method (see the appended paper for the elaboration), the findings of the analysis reveal different aspects of and angles on the findings. Comparing the different results also discloses blind spots and limitations of the single methods, proving the added value of a pluralistic research approach in a field involving such complex concepts as mindfulness:

A) The content analysis (CA) showed effects of the training on self-awareness, well-being, the development of ethical qualities and the influence of the adapted MBI on pre-consumption stages of participants. The method proved relatively easy to apply, while providing a quick overview of the effectiveness of the training.

B) The grounded theory (GT) approach revealed a complex set of conditions that seem to determine whether and how the training had influenced its participants. The picture drawn by the GT thus added a deeper level of understanding to the results of the CA.
C) The interpretive phenomenological analysis (IPA) highlighted individual subjectivity in the mindfulness experience. Different training elements seemed to have varying effects on different participants – which might have been expected. Often, however, and this result was not expected, the strongest effects were ascribed to course elements separate from the formal meditation practice, for example, group discussions after a guided meditation.

D) The discourse analysis (DA) was able to demonstrate the influence of subjective theories held by the participants on the course experience. Participants showed typical rationalization strategies concerning their own consumption. This angle of analysis provided the insight that the experience of MBI participants may strongly be influenced by preconceptions they have on the topic(s), instead of by the practice of mindfulness itself.

Taken together, the methods’ differing findings enriched and supplemented each other and often provided a more nuanced understanding of single effects or connections between effects found in the different methods which would not have been accessible through the application of a single method. The findings of this publication also contribute to future avoidance of making hasty, one-sided and possibly biased interpretations in this type of research. Some researchers emphasize the importance of mindfulness researchers’ own mindfulness practices for being able to personally grasp the complexity of the topic (Grossman, 2008) and for avoiding a biased perspective. However, positive bias from those researchers as well as negative bias from non-practitioners would have both been possible with the application of only the CA (for simplified positive findings) or the DA (which did not capture the clear tendency of the training to have positive effects). The cross-fertilizing approach hence allowed for a more reflective, accurate picture of the actual effects of the MBI, countering the positive publication bias inherent in mindfulness research according to Nowogrodzki (2016) as well as a tendency to insufficiently address and critically reflect on methodological problems and epistemological assumptions (Van Dam et al., 2017).

In the main empirical contribution of this thesis, the A paper, a Mixed-Methods approach integrating the quantitative survey and the qualitative interviews (N=11) was applied. CA was used for the analysis of the data, as the best fit for triangulation with the quantitative results.

The paper focused on the student cohort (N=76) of the BiNKA-project and specifically on effects of the MBI on (sustainable) nutritional behavior. This was done for several reasons. Students are a main target group for ESC and their openness for new approaches was clearly
shown by the fact that demand for the training in this cohort well exceeded the places available for our study. Both attendance and effects were highest for this population. It was thus decided to take a closer look at the factors that contributed to the differing results in this target group. One way of doing so was to analyze effects specifically for this cohort alone. The focus was placed on nutritional behavior because effects across cohorts were strongest in this area, which was to be expected as nutrition is our closest and most intimate area of consumption. The literature on mindful nutritional behavior has shown manifold beneficial effects for participants’ health and wellbeing (Kristeller et al., 2014; Beshara et al., 2013). The question whether the inclusion of sustainability aspects may enhance or complement this process was thus highly relevant for furthering the topic within ESC.

Proceeding from previous work by Geiger, Grossman and Schrader (2019), this part-study further detailed the original four potential mechanisms of mindfulness for sustainable consumption, hence providing a more nuanced overview and contributing to the clarification of the research field:

1. Disruption of routines
2. Physical and psychological well-being
3. Values
4. Pro-sociality and compassion
5. Congruence

Specifically, compassion was added to the pro-sociality mechanisms to clarify the connection between compassion and mindfulness practice (Luberto et al., 2017) as well as its impact on pro-environmental intentions and behavior (Geiger & Keller, 2017; Pfattheicher et al., 2015). The differentiation between physical and psychological well-being was used to upgrade the overall well-being mechanism of mindfulness. This further clarifies the relationship between the verifiable positive effects of mindfulness on physical and psychological well-being (Eberth & Sedlmeier, 2012; Grossman et al., 2004) and the discussion about well-being as a precondition and consequence for sustainable behavior (Geiger et al., 2017(b); Kasser 2017; Corral Verdugo, 2012).

The analysis of the data revealed three inductive effect categories: (1) Effects on mindful eating (2) Effects on sustainability related pre-consumption phases and (3) Effects on sustainability-related consumption behavior.
Category (1) was included to establish the effectiveness of the MBI’s effects on “normal” mindful eating and to test or confirm the results of previous studies. Here, both the quantitative and qualitative data revealed effects on all the participants. For the qualitative part, a short summary of the effect category will be given (for the exact figures of the quantitative results, see paper A in the appendix): Interviewees reported a rise in general awareness and reflection concerning eating behavior, resulting in greater awareness of hunger or satiety and an increased capability to respond to those inner cues. Counteracting automaticity through perceived heightened pleasure while eating was also reported, alongside realizations concerning the extent to which their eating behavior was habitual prior to the training. In some cases, the realization process also included awareness of the production and origin of the foods consumed. These reflections seemed to help the participants curb impulsivity and to allow for self-determined choices. The effects of the training on participants mindfulness level included a reported increase in general compassion and empathy levels. However, those changes were not linked by interviewees to their eating behavior. Effects on ethical qualities remained scarce throughout the other categories, too. Category (2) showed differing results for the two parts of the study; the quantitative survey did not measure intention, but only attitudes. There was no change from pre- to post intervention regarding the participants’ already very strong positive attitudes towards sustainable nutritional behavior (for specific measures, see appendix). The qualitative analysis, however, revealed a multitude of effects on stages before consumption: attitude and intention. Based on the reported increase in awareness about production processes and product origin, a simultaneous rise in appreciation and, in some cases, a change in attitude occurred in participants. The change in attitude led to a strengthened intention to consume sustainably, alongside a reported ease in paying attention to local or organic produce when shopping, for example. For one interviewee, the increased awareness led to a decrease in feelings of bad conscience related to consuming unsustainably, creating a potential rebound effect. The impact of these potentially adverse effects needs to be carefully considered in future research.

In two cases, interviewees who had had the intention to consume less meat before they did the MBI spoke about a naturally occurring decrease in meat cravings, which they both traced back to the mindfulness training. Those cases were also one of two occurrences of actual changes in consumption behavior in category (3). A decrease in meat consumption and an increase in consumption of organic food (unintended by the interviewee before the intervention) were reported. Those single effects, however, were not corroborated in the quantitative sample, which showed no changes in sustainable nutritional behavior.
The contribution of this paper lies in presenting the first empirical results of this thesis, as well as the implications that are drawn from them. Considering that the BiNKA-training was not explicitly tailored to nutritional behavior, the mixed results are more noteworthy than they seem. The analysis revealed the importance of intentions in mindfulness practice. Indeed, in the cases with strongest effects, pre-existing attitudes or intentions about SC were mentioned frequently. There was no one common intention, but rather many individual intentions in this study, as the aim of influencing SC was not revealed to the participants to avoid self-fulfilling response bias. Participants’ intentions were measured before the MBI and did not entail specific wishes to increase SC. Nevertheless, the training actually did affect people’s nutritional behavior and occasionally led to an increase in sustainable food choices. It can thus be concluded that for target groups wanting to align their SC attitudes and intentions with their behavior, an adapted mindfulness training may yield stronger effects and act as a catalyzer for (E)SC.

The fifth paper of this thesis contributed further results. The S article presented effects of the project’s adapted MBI in the school cohort (N=85), focusing on nutrition and clothing consumption. More precisely, the aim of the study was to assess effects on the three aforementioned categories, which were identified as specifically relevant in the overall qualitative data analysis in the project and were slightly adapted to fit the specific research questions both in the A and the S paper. The paper addressing the school cohort focused on (1) effects on SCB in the areas of nutrition and clothing, (2) effects on pre-stages of SCB (e.g., attitudes and intention), and (3) effects on other variables not directly related to SCB (e.g., wellbeing and compassion) (S, 2018). As mentioned before, a Mixed-Methods approach was also applied in the S paper, with a randomized pre-post waitlist control group design including post-intervention qualitative interviews of a random sample (N=14).

The collection of quantitative data proved especially challenging with the school cohort, despite having been shortened in comparison to the other target groups’ survey. Without detailing the process further (see S paper in the appendix), lack of motivation to fill out the survey is an important factor to consider in interpreting the quantitative results here. Furthermore, the inconsistencies between qualitative and quantitative results point to case-related effects. No generalizable conclusions are thus to be drawn.

To facilitate comparing results with the previous paper, the three effect categories will be elaborated in reverse:
Differing from the student cohort in the A paper, no quantitively measurable effect was found for mindful awareness and mindful eating in category (3). Almost half of the interviewees for the qualitative part, however, spoke about how they paid more attention to what they ate and how they went about it and related this to the training. Furthermore, an increase in compassion was measured in both the quantitative and qualitative parts of the study. Regarding further effects not directly related to SCB, an increase in wellbeing among all interviewees was found. The pupils reported higher levels of relaxation, a decrease in perceived stress and more energy. Moreover, a majority of interviewees spoke about an increase in internal and external awareness (e.g. thoughts, bodily sensations or details in their everyday surroundings). Based on those changes in perception, half of the interviewees spoke about differences in their communication and interaction with others. More mindful listening and talking took place, as well as a better regulating of their emotions. Category (2) showed no effects for the quantitative survey concerning SC attitudes, material values or compensatory consumption (which was exclusively measured in the pupil’s cohort). The interviews, on the other hand, revealed several effects. Most participants reported an increase in SC related awareness and impulses to reflect deeper on the topic as a whole and their own behaviors. Some also mentioned a strengthened intention to be more aware in their future consumption behavior. In addition, potentially adverse effects, as described for the student cohort, appeared in the school training as well. For example, one interviewee reported his adjustment of values resulting in less strictness about the (un)sustainability of his consumption decisions. Another realized that increasing mindfulness with himself and people in his immediate surroundings were more important than extending his mind(fulness) to people working in Bangladesh.

Category (1) revealed weak, but significant quantitative effects on food-related SC, but not clothing-related SC. Concerning the interviews, only two of the 14 participants reported effects on their consumption behavior. One person became vegetarian for one month following the training and explicitly named group discussions and mindful eating exercise, and not the meditation practice, as a driver. The other person stated that her whole family was now more aware of the SC of clothing and that they had researched brands and discussed solutions together.

Despite several limitations and the previously mentioned inconsistencies between qualitative and quantitative results, the authors suggest further exploration of mindfulness potential for ESC for pupils. Based on the reported effects, an inclusion of mindfulness practice may be a promising approach for a more holistic engagement with SC in school.
To support further continuative research into the nexus of mindfulness and (E)SC, the limitations encountered during research for this thesis’s publications and resulting recommendations will be elaborated on in the following chapter.

4.2 Limitations and recommendations for future research

The field of mindfulness research in general and especially in the context of ESC has seen dramatic growth in the last decade. This growth, which some even call a hype (Purser, 2019), has brought along several teething problems, which are to be associated with this rapid growth and the spreading of the concept into so many social fields beyond science.

The JoCP paper elaborated on both methodological and empirical shortcomings and limitations found in the literature review (see results chapter and the full paper in the appendix). The most important takeaway was the urgent need to improve study design and methodological thoroughness. Those findings were confirmed by other studies for general mindfulness research (Goldberg et al., 2017).

In the following, the limitations encountered in the other papers will be summarized. In line with the aforementioned, for the empirical publications of this thesis it would have been useful to have a more nuanced and comprehensive set of measurements for both mindfulness and the specific context in which it is applied. A more differentiated model of the various parts of mindfulness training could have helped facilitate a better analysis concerning which specific practices evoked which corresponding effects in participants, thus allowing for more nuanced results. Randomized controlled research designs that include control groups and draw from the general publication instead of experienced mindfulness or SC practitioners should be favored.

A general limitation encountered in mindfulness research – which was also relevant to the empirical papers in this thesis – concerns the psychometric property and construct validity for quantitative mindfulness scales, both in need of improvement to create reliable and valid instruments for all target groups. A strategy to counteract current deficiencies, which we applied and strongly recommend, is the use of Mixed-Methods approaches. However, merely adding on qualitative methods is not sufficient here. Rather, the use of sophisticated qualitative methods is required, and ideally more than one. Incorporating observation of participants and assessments of their family or partners is another way to enhance Mixed-Methods approaches and the reliability and validity of the results. Concerning the setting of the intervention, we recommend announcing the explicit aim of the study and engaging participants with a similar intention, that is, to adapt their consumption behavior to match their inherent values and
attitudes. The inclusion of the ethical background and education inherent in the holistic definitions of mindfulness should always be clearly communicated and discussed openly. In that way, the collective dimension of mindfulness in relation to SC (or other relevant topics) will become a natural aspect of developing one’s practice. Consigning responsibility primarily to the individual is thus avoided, alongside reducing the risk of abusing mindfulness to become more self-absorbed and detached, as some critiques claim is possible (Poser, 2019).

Another limitation important to mention is the length of the MBI researched in this thesis. Eight weeks, in hindsight, seem too short to influence habitual behavioral patterns. We thus call for longitudinal studies with longer and more continuous formats to build up and ensure a certain amount of individual practice time. Lastly, while the three target groups addressed in our study are all important parts of the ESC population, broadness prevented a more nuanced catering to specific characteristics of each group. Future studies should focus solely on either students, pupils or employees and adapt the MBI to their specific requirements and backgrounds.

The transition to the concluding chapter of this thesis is occasioned by some qualitative study participants’ unexpectedly ascribing effects on their consumption behavior to informal mindfulness practices in the MBI, such as group discussions or information and insight received in dyadic exercises. These findings had two consequences. First, they confirmed the urgent need for a more differentiated model of specific modes of action in differing mindfulness practices in order to target precise outcomes in topic-specific MBIs. Second, they caused a discussion within the team about the usefulness of broadening the repertoire of personal, self-reflexive practices to include methods beyond mindfulness, which will be elaborated on in the following.

5 Conclusion & Outlook
So far, ESC has focused on the development of dominantly discursive-intellectual competencies. The overarching goal of this dissertation was to explore and analyze the potential of mindfulness as a practice to support and strengthen affective-motivational skills, in order to forward a more holistic approach to ESC.

The framework text provided an overview of the main topics relevant for the endeavor before narrowing in on the 5 individual articles, their approaches, methods and findings. While there have been some conceptual works on the nexus between mindfulness and (E)SC – as elaborated on in the literature review, the first contribution of this thesis – no intervention study had been carried out before. The framework text thus also gave an account of the navigation process in this new field of research. The development of a consumption-specific mindfulness training
was elaborated on in the second contribution, followed by a discussion and evaluation of different qualitative methods, to address the field as part of the BiNKA-project. Empirical findings for two of the three target groups addressed in the larger project were also presented. General limitations in mindfulness research and the specific ones we encountered, as well as critical voices, were included in the framework text, too, along with recommendations for building a stable and more nuanced groundwork for future research.

The exploration and analysis of the potential of mindfulness for ESC concludes several ways in which the practice, applied with the traditional Buddhist understanding as a base, can indeed support a more holistic ESC. The potential to clarify values, decreasing materialistic ones, and strengthening intentions and attitudes towards SC through increased awareness and self-perception were verified. General well-being was shown to improve in a majority of participants, which is an important precursor for SC and thus constituting another potential of mindfulness for ESC. A strengthening of pro-social behavior through a rise in compassion and empathy was described, too. However, this development was not fully connected to SC-relevant behavior and needs to be further researched in explicitly SC-specific MBIs to develop the concept's potential for strengthening ESC further.

The research of this thesis also revealed manifold limitations and ongoing teething problems in the field and provided recommendations for future research. Apart from that, two specific effects need to be considered. A very small number of participants mentioned adverse effects, such as a decreased SC resulting from less “bad consciousness” about it for example. This phenomenon needs to be carefully analyzed and accounted for in future research. The very limited effects reported by participants about behavioral changes concerning their SC, which were furthermore only measured in the qualitative study, need to be considered, too.

One way of doing so, while further exploring and grounding the general approach and the identified potential mechanisms of mindfulness for ESC, is broadening the scope of practices. Based on the elaborations in this dissertation, this opening is strongly recommended. To include the largely neglected micro level – the very individual ways humans make sense of the world through means of perception, awareness about that perception and relating to their experience in the discourse on ESC and SD – is also seen by others as an “essential extension” to the discourse around SD (Parodi & Tamm, 2018, p. 5). That this very individual-focused approach requires a broad(er) range of choices concerning how to introspectively engage with one’s inner world and subjective experiences than one concept can offer, was an intermediate result during the BiNKA-project. This was confirmed by experiential research during a newly developed
university seminar on personal approaches to sustainable consumption, conducted by the author of this thesis and Pascal Frank at Leuphana University, Lüneburg during a period of 18 months, starting in 2016 (see Frank & Stanzus, 2019, for further details and empirical results). Here, the two student cohorts (30 and 20 students respectively) learned a variety of tools and methods for systematically observing and analyzing their inner world including subjective states and processes. Mindfulness practices, rooted in the ethical values of the Buddhist tradition, provided the base for other introspective methods introduced, which were drawn from coaching, psychotherapy and other relevant fields (e.g. micro-phenomenological interviewing, practices from deep ecology, motivational interviewing and other, communication-based practices). By mobilizing students’ individual resources through the array of methods offered, they became verifiably better able to handle and overcome the personal challenges encountered in their specific transformation projects.

Further investigating and including this previously unexplored field of individual, or personal, sustainability through an array of introspective practices may add the perspective needed in ESC and SD. Connecting the neglected inner world of individual people to the actual outer world could bring about the transformation needed to ensure both worlds have a peaceful and healthy future ahead.
6 References


Eurobarometer. (2014). *Attitudes of European citizens towards the environment*.


https://doi.org/10.1177/0013916515574549

https://doi.org/10.1177/01461672982982411002


https://doi.org/10.1007/s12671-015-0467-7

https://doi.org/10.1023/B:SORE.0000027411.35832.53


## Appendix 1: Overview of individual papers and author contributions

<table>
<thead>
<tr>
<th>Publication</th>
<th>Part of individual contribution</th>
<th>Weighting factor</th>
<th>Status of publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fischer, D., <strong>Stanszus, L.</strong>, Geiger, S., Grossman, P., &amp; Schrader, U. (2017). Mindfulness and sustainable consumption: A systematic literature review of research approaches and findings (p. 40-86)</td>
<td>Important contribution</td>
<td>0,5</td>
<td>Published in <em>Journal of Cleaner Production</em> (162, 544–558. <a href="https://doi.org/10.1016/j.jclepro.2017.06.007">https://doi.org/10.1016/j.jclepro.2017.06.007</a>)</td>
</tr>
</tbody>
</table>
Appendix 2: Individual papers

The papers have been partly edited (font, font size) for undisturbed readability, however, specifics concerning numbering, references and paragraphs have remained in the default format of the specific publication journal. Apart from paper no. 3 (which is a pre-print version), post-print versions of the papers are presented.
i. Mindfulness and sustainable consumption: A systematic literature review of research approaches and findings


**Abstract**

Mindfulness, derived from Buddhist origins, refers to deliberate, unbiased and openhearted awareness of perceptible experience in the present moment. With its focus on cultivation of benevolent and clear-headed values and actions to self, others and the world, as well as its possible value in fostering greater coherence between values, attitudes and behavior, the concept of mindfulness has most recently attracted the interest of scholars in sustainable consumption research. So far, however, research on the connection between mindfulness and sustainable consumption is scattered across different disciplines and lacks integration. This paper contributes to a consolidation of the field. Based on a systematic literature review (N\text{initial sample}=1,137 publications, N\text{preliminary sample}=32, N\text{final sample}=7), it represents a stocktaking exercise to evaluate the research methodologies used and findings reported in the emerging field of empirical research relating mindfulness to sustainable consumption. The focus of the review is on four potential mechanisms of mindfulness for sustainable consumption that have been postulated in seminal conceptual works in the field: to disrupt routines, to promote more congruence with regard to the attitude-behavior gap, to nurture non-materialistic values, to enhance well-being, and to foster pro-social behavior. Preliminary evidence suggests support for these assumed potentials. However, the review also reveals that there are serious methodological challenges and shortcomings in existing empirical approaches, namely with regard to definitional issues, the development and use of instruments, selection of samples, study designs and the inclusion of mediating or moderating variables. The paper concludes with a discussion of challenges and recommendations for future work in the field.

**Keywords:**

Mindfulness; meditation; sustainable consumption; literature review; methodology; consumer behavior
1. Introduction

Consumption has emerged as a key priority area in research and policy-making related to sustainable development. Given the significant impact of such different consumption areas as food and nutrition, mobility, housing or textile consumption (Ivanova et al., 2015; Tukker et al., 2010), the search for approaches to promote more sustainable consumer behaviors has become somewhat of a “holy grail“ (Kenis and Mathijs, 2012) for researchers and policy makers alike. Despite advances made in recent years in sustainable consumption research (SCR) (Reisch and Thøgersen, 2015), the search for evidence on how consumer behavior can be more effectively influenced towards sustainability remains an ongoing and pressing issue for the SCR agenda (Kaufmann-Hayoz et al., 2012). Debates about future directions for SCR commonly refer to three key challenges.

A first key challenge addresses the question of how individual factors like knowledge, problem awareness or attitude actually relate to respective actions and behaviors – commonly referred to as knowledge-action gap, awareness-behavior gap or attitude-behavior gap (Kollmuss and Agyeman, 2002). SCR has shown that consumption behaviors are, to a significant extent, shaped by routines and habits (Fischer and Hanley, 2007, Schäfer et al., 2012) and embedded in broader social practices (Spaargaren, 2003) that entail often unquestioned conventional, or “normal,” standards for consumption behaviors (Shove, 2003). Hence, researchers in SCR are called upon to explore and advance approaches that effectively reduce the attitude-behavior gap by enhancing the capacity of individuals to reflect upon these routinized behaviors and to re-align them with their underpinning values and intentions.

A second key challenge emerges from the fact that SCR does not represent a single discipline, but is constituted by a field of disciplines related to specific SCR issues (Lorek and Vergragt, 2015). SCR is characterized by innovations and insights drawn from quite varying inter- and multidisciplinary perspectives (Di Giulio et al., 2014). Given these variations, a major task for SCR, as a largely problem-driven field, is to promote work on the interface between different disciplines and discourses in related fields without becoming too fragmented.

A third key challenge refers to a lack of comprehensive, systematic overviews of SCR findings on policy-relevant topics. Studies in SCR indicate that perceived inconclusiveness of findings may hamper decision-makers’ utilization of relevant evidence from the field (Heiskanen et al., 2014), causing what has been termed “implementation gap” (Tukker et al., 2006). In light of this, a key challenge for SCR is to advance and consolidate an evidence base of effective approaches to study and promote sustainable consumer behavior, from which both the
The research presented in this paper attempts to address these key challenges within the framework of a specific issue. We focus on mindfulness research as a vibrant and rapidly emerging area that has inspired researchers in many fields in the past years, including SCR (key challenge 2, section 3). A strong interest in respect to SCR is to elucidate the possibility of mindfulness for influencing the attitude-behavior gap and consequently promoting sustainable consumption behavior (key challenge 1; section 4). As with any new field of research, the existing body of empirical studies on the connection between mindfulness and sustainable consumption is, so far, rich in pilot studies among different disciplinary fields, but rather fragmented and hardly integrated into an overall perspective. For this purpose, we have conducted a systematic literature review (SLR). In light of the lack of integrating and synthesizing reviews in this emerging field, this paper seeks to provide a systematic overview of the state of empirical research on mindfulness and sustainable consumption (key challenge 2; sections 5 and 6). The main research questions (RQ) underpinning this study are the following:

RQ 1  How many empirical studies exist on the nexus between mindfulness and sustainable consumption?

RQ 2  How were these studies conducted?

RQ 3  What are their results?

As a necessary foundation for answering the research questions outlined, we first give some theoretical background to the notion of mindfulness, as well as its relevance for SCR. The main part of the paper describes the specific methodology of the SLR used in this study and presents and discusses the findings of the review. Finally, we provide recommendations for the future development of this promising field of research and its overall contribution to address key challenges in SCR.

2. Mindfulness and Sustainable Consumption Research

Mindfulness has become a subject of interdisciplinary research in recent years. In what follows, we sketch the origins of the concept, highlight key characteristics and elaborate on the potential of mindfulness for SCR based on empirical findings that have sparked interest in mindfulness among different research communities.
2.1 Mindfulness: an emerging field of research

Mindfulness is a word for which a considerable number of diverging definitions exists, one set primarily derived from a cognitive psychological orientation (Langer and Moldoveanu, 2000), and another set adapted from Buddhist psychological concepts (Chiesa, 2013; Grossman, 2010 and 2015; Kabat-Zinn, 2003). Current difficulty in defining mindfulness in the scientific and clinical literature can partly be attributed to this diversity of origin, as well as to its recently, highly varied secular adaptations, particularly in clinical and behavioral research (Grossman, 2010).

Mindfulness, as understood for this SLR, aligns with the traditional Buddhist definition of the concept. It is characterized by a deliberate and conscious focus on the present moment (Brown and Ryan, 2003; Kabat-Zinn, 2003) that includes a dispassionate, but openhearted awareness of perceptible mental states and processes (Grossman, 2010). This special kind of attentiveness refers to the act of cultivating unbiased awareness of all moment-to-moment perceptible experience, whether sensory, affective, thought-related or imaginal, maintaining contact to one’s immediate experience and letting it pass (as well as momentarily possible) without aversive or appetitive emotional responses. The concept of mindfulness in its traditional Buddhist conception is rooted in the distinct interpretative horizon of Buddhist psychology (Hyland, 2011), which proposes that cultivation of mindfulness is intrinsically tied to the emergence of specific intentions and attitudes towards ourselves and others, such as kindness, compassion, generosity and equanimity (Grossman, 2013, 2015). It is believed that mindfulness can be enhanced by means of a variety of practices that systematically train awareness and emotional (non-) reactivity. These practices are considered to nurture the development of ethical values aimed at benevolence toward the animate and inanimate world (Grossman, 2015). They may also facilitate a greater awareness of thoughts, emotions and responses to stimuli, in contrast to habitual automatic reactions to them (Chambers et al., 2009: 569).

Bibliometric data of the key terms “mindfulness” and “sustainable consumption” derived from SCOPUS database shows the exceptional growth of research on mindfulness) over the past years. While the number of publications on sustainable consumption has grown by factor 5 in the course of the time period covered in the database analysis, similar publications on mindfulness have increased from about 80 in 2004 to more than 1.450 in 2015.

Alongside the growth of the field, contexts have started changing, too, moving research on mindfulness beyond the clinical context (for more information see Bolz and Singer, 2013; Grossman et al., 2004; Kabat-Zinn et al., 1992) into, for example, healthcare, psychology and
neuroscience. Notable benefits of mindfulness programs found in these studies include the reduction of stress levels through mindfulness practice, as well as improvement of individual well-being and other health-related conditions, such as anxiety, satisfaction with life or possibly even physiological processes, e.g. immune function (Chambers et al., 2009). Positive effects on self-esteem, self-acceptance as well as (self-) compassion and empathy have also been reported (Birnie et al., 2010; Bolz and Singer, 2013; Chiesa and Serretti, 2009; Shapiro et al., 1998).

In the social psychological context, an empirical study by Chatzisarantis and Hagger (2007) suggests that attentional aspects related to mindfulness may be associated with narrowing the aforementioned “attitude-behavior-gap” in consumer behavior research by aligning participants’ intentions to engage in health-related behaviors with their actual behavior. Further empirical research has identified a positive relationship between self-compassion, as a potential consequence of mindfulness, and pro-social and altruistic behaviors (Bolz and Singer, 2013).

The aforementioned research does not explicitly relate to consumption. The following section will make that link by discussing existing pioneer conceptual works on the connection between mindfulness and consumption, as well as some empirical findings in mindfulness research that directly relate to consumption.

2.2 Mindfulness: a relevant concept for sustainable consumption research?

One of the earlier conceptual proposal on how mindfulness might be able to contribute to sustainable consumption comes from Rosenberg who sees a twofold contribution of the cultivation of mindfulness: By enhancing awareness of “potentially accessible cognitive-behavioral processes underlying consumption that have become relatively automatic” (Rosenberg, 2005: 108), mindfulness would allow for more deliberate choices. Additionally, mindfulness might re-instill a sense of interconnectedness and interrelatedness between people as a genuine (or synergetic), non-consumerist satisfier of the need for fulfillment. Pilot studies in mindfulness research by Pollock et al. (1998) and Dong and Brunel (2006), indeed, suggest that susceptibility to particular marketing techniques and persuasion “can be reduced when people are more mindful” (Rosenberg, 2005: 111) and that the cultivation of mindfulness might be a supporting factor in achieving greater personal well-being and more ecologically sustainable lifestyles at the same time (Crompton and Kasser, 2009).

More recently, Ericson et al. (2014) and Bahl et al. (2016) proposed detailed argumentations on how mindfulness could change our consumption patterns. The authors agree with Rosenberg (2005) that mindfulness could positively influence consumers’ awareness of their own
(consumption) habits and strengthen non-materialistic values in life, leading to reduced aspirations to consume.

In summing up the available conceptual discussions of how mindfulness could promote changes in consumption behaviors, we find four main facets referring to the potentials of mindfulness for SCR:

1. **Disruption of routines**: There is broad agreement that mindfulness practice may enhance awareness, enabling individuals to observe and change previously unconscious habits, or as sometimes referred to: switch off the autopilot mode (Grossman et al., 2004). For sustainable consumption this holds the potential to diminish unconscious, non-sustainable consumption choices (Rosenberg, 2005; Bahl et al., 2016).

2. **Congruence**: Self-perceived inattention to everyday experiences was found to be associated with a widening of the attitude-behavior gap (Chatzisarantis and Hagger, 2007). As mindfulness implies the inverse of inattentiveness, i.e. enhanced awareness of immediate daily experiences, mindfulness could be associated with closure of the attitude-behavior gap, which is supportive of more sustainable consumption patterns (Ericson et al., 2014; Rosenberg, 2005).

3. **Non-material values and wellbeing**: Mindfulness practices may be conducive to clarifying values and enhancing the role of non-material values in people’s lives (Ericson et al., 2014). As described above, the modern Western understanding of mindfulness is rooted in Buddhist psychology, which proposes that three unwholesome qualities are common in human attitudes and behavior: greed, delusion and aversion (Grossman, 2015). Exercising mindfulness is proposed as one approach to counteract these unwholesome tendencies by cultivating openness, generosity, kindness and mental clarity. The latter antidotal mental qualities are, on the other hand, seen as necessary for the phenomenological process of investigation of self and other that defines mindfulness (in order to be able to maintain an open, unconditional stance in the face of the vagaries of human experience). As a consequence of fostering benevolent attitudes, mindfulness may literally foster embodiment of an eudaemonic tone during its enactment. Consequently, mindfulness may not only enhance individual well-being, but also contribute to greater intrinsic and socially oriented values and behavior, as opposed to materialistic, hedonistic values (and corresponding behavior) (Burroughs and Rindfleisch, 2002; Kasser et al., 2014; Richins and Dawson, 1992).

4. **Pro-social behavior**: Consistent with the above-mentioned essentially ethical functions
of mindfulness, recent evidence suggests that pro-social behaviors are among the outcomes of meditation practice (Lim et al., 2015). Especially other-oriented meditation techniques (e.g. loving-kindness or metta meditation) has shown to increase compassion (Condon et al., 2013) and pro-social behaviors (Leiberg et al., 2011). Compassion as an emotional source for pro-social behavior in turn was shown to be positively linked to pro-environmental intentions (Pfattcheicher et al., 2016). In line with this, pro-social or altruistic values have shown to have a weak but consistently positive influence on different environmental beliefs and behaviors (de Groot and Steg, 2008; Steg et al., 2014) and were identified as an important factor for people’s motivation to adopt lower-carbon lifestyles (Howell, 2013). Therefore, benefits of mindfulness consistent with values of benevolent behavior may generalize from self and other to the larger animate and inanimate world we inhabit (Grossman, 2015).

Despite the recent emergence of different theoretical proposals to link mindfulness and consumerism, as well as increased efforts to empirically investigate this nexus, the connection of mindfulness and sustainable consumption remains a largely unresearched area. In what follows, we present a SLR conducted to evaluate empirical evidence regarding the five above-mentioned potential mechanisms by which mindfulness possibly influences peoples’ consumption patterns.

3. Method: Systematic Literature Review

To address the research questions, we conducted a SLR, which is a rigorous approach to provide an overview of a research field and the results it has produced. This method has received growing attention in past years for a number of reasons. SLRs meet the need for orientation in light of the rapidly growing body of publications that can hardly be overlooked by individuals anymore (Ridley, 2012). Not least there is need to base policy decisions on syntheses of high-quality, rigorously identified, available evidence. A widely accepted definition of a SLR refers to “a systematic, explicit, and reproducible method for identifying, evaluating and synthesizing the existing body of completed and recorded work produced by researchers, scholars and practitioners” (Fink, 2009: 3). Importantly, a SLR from this perspective is not simply an introductory component of a research study, but rather, “in itself a research study, addressing research questions and using the literature as data to be coded, analyzed and synthesized to reach overall conclusions” (Ridley, 2012: 190).
Our main intention in carrying out a SLR is to contribute to the formation of a broader research agenda by conveying a meta-perspective on the field. In this perspective, we do not only seek to explore what has been found out in existing empirical studies, but just as much how the nexus of mindfulness and sustainable consumption has been researched methodologically. SLR methodology is an approach to serve this purpose. While SLRs have traditionally been used to aggregate and synthesize quantitative and qualitative data (which was and is indeed the primary application of SLR), they have recently been also employed to identify and reflect on trends in research fields (see e.g. Ceulemans, Molderez and Van Liedekerke, 2015; Barth and Rieckmann, 2016).

3.1 Data collection

Data was collected in three steps using different sources in each step: database, and supplementary and conclusive search. Each step of data collection was embedded in a specific stage of the iterative process of screening publications (see Fig. 1). In order to identify recent and quality-checked research into mindfulness and sustainable consumption, our SLR focused on peer-reviewed journal articles and PhD dissertations as two publications forms that convey recent state-of-the-art research.

Figure 1. Sequential procedure used in SLR

As a starting point of data collection in the SLR, a database search was performed using SCOPUS as a major reference database for peer-reviewed journal articles and ProQuest Dissertations & Theses A&I as a resource for PhD dissertations. Given the exploratory nature of much of the research, the search string used was deliberatively broad in scope and focus, in
order to identify relevant literature that did not explicitly employ the terminology of mindfulness and sustainable consumption. A search string was designed that consisted of three components linked by the Boolean operator AND. The semantic fields covered by the three components were mindfulness, sustainability and consumption. Within the sustainability and consumption components, several related terms were included using the Boolean operator OR. Wildcards were used to include inflected forms of the terms. The full search strings are documented in Appendix A.

Both database searches were performed in November and December 2015 and yielded a total number of 879 results (SCOPUS = 540, ProQuest = 339). In addition to the publications retrieved from the database search, further publications were identified in later steps of the iterative process (N = 258, see below for details). All publications retrieved (N = 1,137) then underwent practical screening. At a further stage of the process, the title and abstract of each publication were screened against two formal and two content-related criteria. The two formal criteria referred to the publications’ eligibility for this review’s scope. Inclusion criteria were peer-reviewed journal article or dissertation in either English or German and that primary empirical research was presented. The two content-related criteria identified the thematic relevance for this review’s scope. Inclusion criteria at the stage of practical screening were defined with a deliberately broad scope to ensure that publications of potential relevance were included in the preliminary sample: the publication had to be informed by an elaborated understanding of mindfulness and focused on at least one aspect of sustainable consumption. With regard to the understanding of mindfulness, the criterion was met when mindfulness was not just considered in terms of cognitive complexity (e.g. Langer and Moldoveanu, 2000) but more comprehensively underpinned by the Buddhist meditative tradition outlined before in section 2 of this paper. With regard to aspects of sustainable consumption, the criterion was met when the research presented focused on at least a particular stage of consumption (e.g. disposal) and contextualized it in its impacts on sustainable development (e.g. ecological impacts). The titles and abstracts of all 1,137 publications of the initial sample were screened by two independent researchers (research assistants). In case of disagreement between the two independent raters, a third rater (senior researcher) decided on a final rating. The publications passing the initial selection stage of practical screening formed the preliminary sample (n=32).

In a second selection stage, all publications of the preliminary sample then entered in-depth screening. Here, the full texts of all publications were checked against the inclusion/exclusion criteria by two independent raters (senior researchers), with a third rater (senior researcher)
deciding in case of disagreement. The publications passing the second selection stage of in-depth screening entered the pre-final sample. All publications of the pre-final sample were then also used to identify further relevant publications through supplementary, namely bread crumbing, pearl growing and hand searches. In a bread crumb search, the reference section of a publication is screened for further eligible publications. In a pearl growing search, citation reference databases are used to identify further publications that are citing a paper that has already been identified as relevant. In a hand search, documents from selected sources such as academic journals or professional organizations that focus explicitly on the topic under investigation are scanned for relevant sources (e.g. newsletters, table of contents). Just like the publications identified through database searches, all additional publications identified through bread cruming (N = 14), pearl growing (N = 242), and hand searches (N = 2) entered the initial sample and then underwent the standard procedure, i.e. practical screening. Raters also controlled for duplicates to ensure that no publication was added and rated twice. From the 258 publications identified through supplementary search, 12 publications entered the preliminary sample.

In the last step of conclusive search, the final sample (n= 7) composed based on the database, bread cruming, pearl growing and hand searches was submitted for a review to two senior experts in the field, one from the field of sustainability science and one from the field of mindfulness research, asking them to complement the selection with relevant publications not included yet. The expert review identified no further publications that had not been previously included already. The composition of the different samples by source and search step is shown in Table 1.

Table 1: Composition of samples by sources and steps

<table>
<thead>
<tr>
<th>Search Step</th>
<th>Source</th>
<th>Sample</th>
<th>Initial</th>
<th>Preliminary</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Database</strong></td>
<td>SCOPUS</td>
<td>540</td>
<td>17</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ProQuest</td>
<td>339</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Supplementary</strong></td>
<td>Hand Search</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bread Crumbing</td>
<td>14</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pearl Growing</td>
<td>242</td>
<td>9</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Conclusive</strong></td>
<td>Expert Review</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>1137</td>
<td>32</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Data analysis

Data on methodological approaches (RQ 2) and empirical findings (RQ 3) was extracted from the publication in the final sample. In the data extraction step we followed the procedure suggested by Fink (2009) that aims to ensure uniform data collection. An abstraction form was developed to identify specific methodological approaches (RQ 2) according to four categories (see left column in Table 2): research questions asked, definition and operationalization of mindfulness and sustainable consumption as well as sample and study design for the quantitative studies, and analytical approach, data collection and interpretation for the qualitative studies (see Fink 2009). A comprehensive account of the categories is presented in Tables 3 (quantitative) and 4 (qualitative) studies. Additional categories for mixed-methods were: objectives/rationale pursued by mixing methods, levels and weight of integration, sequence, and relation of concepts studied to methods applied (Johnson, Onwuegbuzie and Turner, 2007; Brake, 2010; Bergman, 2010). These categories however were not applied and are not reported in what follows due to the absence of studies in the final sample using mixed methods.

Each publication was then also screened for empirical findings (RQ 3). This was informed by our previous analysis of the conceptual discussion of the potentials of mindfulness to promote sustainable consumption (see section 2.2). The publications in the final sample were, therefore, analyzed for findings relating the four identified potentials of mindfulness for SCR postulated in the conceptual literature (see right column in Table 2, as well as Table 5 for an overview). In addition to these pre-defined categories, we also screened the publications for additional findings relevant to our research questions. The procedure of data collection in the SLR methodology used in our study corresponds to content analysis (using deductive coding) insofar as it involves the definition of categories and a coding process of relevant text passages matching these categories. Data extraction and analysis were performed by senior researchers with expertise in quantitative and qualitative research.

Table 2: Criteria guiding data extraction and analysis of final sample

<table>
<thead>
<tr>
<th>Methodological Approaches</th>
<th>Empirical Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) What research questions are addressed?</td>
<td>Does mindfulness …</td>
</tr>
<tr>
<td>(2) How is mindfulness understood and measured?</td>
<td>(1) … disrupt routines?</td>
</tr>
<tr>
<td>(3) How is sustainable consumption understood and measured?</td>
<td>(2) … promote more congruence with regard to the attitude-behavior gap?</td>
</tr>
</tbody>
</table>
(4) How is the study designed with regards to methods and sample?  
(3) ... promote non-materialistic values and well-being?  
(4) ... promote pro-social behavior?

4. Results

The first important result of our review is that only seven publications met our criteria and represent empirical studies on the nexus between mindfulness and sustainable consumption (see RQ 1). Of these seven publications (see Table 3 and Table 4), five use an exclusively quantitative approach (publication 1-5), one employs an exclusively qualitative approach (publication 7) and one publication uses both quantitative and qualitative approaches (publication 6). However, it is a rather cumulative than integrative work, which is why, for this analysis, each of these three studies presented in publication 6 will be analyzed separately (referring to as 6a, 6b and 6c, see Tables 2 and 3) and the publication will not be considered as a mixed-method study. We will present our findings with regard to methodological approaches and empirical results in two separate sections.

4.1 Methodological approaches

This section presents the results of our analysis of how the studies were conducted (RQ 2). It is structured according to the criteria used in the data extraction as outlined in Table 2.
Table 3: Overview of methodological approaches taken by quantitative studies within the final sample

<table>
<thead>
<tr>
<th>No</th>
<th>Reference</th>
<th>Research Question</th>
<th>Sample (n)</th>
<th>Study design</th>
<th>Mindfulness</th>
<th>Sustainable consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown and Kasser, 2005</td>
<td>Can people live so as to promote both personal and planetary wellbeing? Can mindfulness explain this relationship?</td>
<td>General population (200) vs. simple lifestylers (200)</td>
<td>Correlational study (SEM with group comparison)</td>
<td>receptive attention and awareness</td>
<td>MAAS (15)</td>
</tr>
<tr>
<td>2</td>
<td>Amel et al., 2009</td>
<td>Is mindfulness toward internal and external stimuli positively correlated with sustainable behavior?</td>
<td>Eco fair visitors (500)</td>
<td>Correlational study (Regression)</td>
<td>self-regulating attention and observing sensations</td>
<td>FFMQ, 2 facets: AWA (8) and OBS (8)</td>
</tr>
<tr>
<td>3a</td>
<td></td>
<td>Does connectedness to nature indirectly</td>
<td>Students (360)</td>
<td>Correlational study</td>
<td>unclear mix intentional</td>
<td>FFMQ (39)</td>
</tr>
<tr>
<td></td>
<td>Authors and Year</td>
<td>Question</td>
<td>Study Design</td>
<td>Data</td>
<td>Key Constructs</td>
<td>Findings</td>
</tr>
<tr>
<td>---</td>
<td>------------------</td>
<td>----------</td>
<td>--------------</td>
<td>------</td>
<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>3b</td>
<td>Barbaro and Pickett, 2016</td>
<td>Does affect the relationship between mindfulness and pro-environmental behavior?</td>
<td>General population (296)</td>
<td>(Mediation)</td>
<td>awareness / behavioral regulation</td>
<td>All five facets</td>
</tr>
<tr>
<td>4</td>
<td>Jacob et al., 2009</td>
<td>Is there a significant relationship between mindfulness meditation and environmentally sustainable behavior (ESB)?</td>
<td>Buddhist Peace Fellow members (829)</td>
<td>Correlational study</td>
<td>Process dimensions of Mindfulness meditation</td>
<td>(4): mind slowing down, stillness, ability to see thoughts without becoming attached to them, watch emotions without being carried away by them*</td>
</tr>
<tr>
<td>5</td>
<td>Brinkerhoff and Jacob, 1999</td>
<td>Do back-to-the-land experiences rather relate to mindfulness or church attendance?</td>
<td>Back tolanders (565)</td>
<td>Correlational study</td>
<td>Buddhist Mindfulness values</td>
<td>(7): Sense of wonder, union with nature, peace of mind, wholeness, joy, living in the present moment being accepted in the universe*</td>
</tr>
<tr>
<td>6a</td>
<td>Armstrong, 2012</td>
<td>Do associations exist between measured variables?</td>
<td>General population</td>
<td>Correlational study</td>
<td>Holistic approach, FFMQ (39)</td>
<td>a) Pro social and pro-</td>
</tr>
<tr>
<td>6b</td>
<td>What do individuals learning mindfulness experience and what do they notice regarding their consumption behavior?</td>
<td>University employees (n=9)</td>
<td>Intervention study (only post)</td>
<td>All five facets</td>
<td>Environmental behavior</td>
<td>a) Ethical and environmental behavior</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>6c</td>
<td>From such individuals [compulsive consumers], what can be concluded regarding the mechanisms by</td>
<td>Compulsive shoppers (n=12)</td>
<td>Intervention study (pre post)</td>
<td>All five facets</td>
<td>Compulsive buying</td>
<td>b) Compulsive buying</td>
</tr>
</tbody>
</table>
which mindfulness induces change?

Scales abbreviation used:

- MAAS: Mindful Attention and Awareness scale (Brown and Ryan, 2003), similar to AWA
- FFMQ: Five Facet mindfulness Questionnaire (Baer et al., 2006): all five facets: Nonreactivity, Acting with Awareness (AWA), Observing (OBS), Describing, Nonjudgment
- EFQ: Ecological Footprint Questionnaire (Dholakia and Wackernagel, 1999)
- PEB: Pro Environmental Behavior Scale (Whitmarsh and O'Neill, 2010)
- CBS: Compulsive Buying Scale (d'Astous et al., 1990)
- * Ad hoc development of the publication’s author(s)
Table 4: Overview of methodological approaches taken by qualitative studies within the final sample

<table>
<thead>
<tr>
<th>No</th>
<th>Reference</th>
<th>Research Question</th>
<th>Sample (n)</th>
<th>Mindfulness construct</th>
<th>Sustainable consumption construct</th>
<th>Analytical approach</th>
<th>Data collection</th>
<th>Interpretations based on data</th>
</tr>
</thead>
<tbody>
<tr>
<td>6b</td>
<td>Armstrong, 2012</td>
<td>What do individuals learning mindfulness experience, and what do they notice regarding their consumption behavior and in general?</td>
<td>University employees (n=12)</td>
<td>Holistic approach based on Kabat-Zinn’s definition</td>
<td>Detailed conceptualization of varying perspectives – focus on pro-social, pro-environmental and lowering consumption</td>
<td>Thematic analytic approach &amp; Interpretative Phenomenological Analysis (IPA)</td>
<td>Semi-structured interviews</td>
<td>Yes</td>
</tr>
<tr>
<td>6c</td>
<td></td>
<td>If compulsive buyers are learning mindfulness, what do they experience? Are measureable levels of factors associated with mindfulness, compulsive buying, psychological wellbeing, sense of self, or shopping outcomes altering in such individuals?</td>
<td>Compulsive and “normal” shoppers (n=18)</td>
<td></td>
<td></td>
<td>Pre-/post-design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Essen and Mårtensson, 2014</td>
<td>How do young adults use their lived bodily experience of organic food as the starting point for lifestyle exploration? How do they use these experiences as a life strategy for well-being and vitality?</td>
<td>Organic food consumers (18-35 years) (n=10)</td>
<td>Concentration on mind-body awareness / sensitivity to nutrition related body sensations</td>
<td>Non specified use of the term “organic food consumers”</td>
<td>Descriptive phenomenological psychological method</td>
<td>Semi-structured interviews</td>
<td>Partly</td>
</tr>
</tbody>
</table>
(1) Research questions

Two publications (1 and 4) looked at the role of aspects of mindfulness in the apparent tension between subjective well-being, on the one hand, and ecologically responsible/sustainable behavior, on the other. They tested whether mindfulness served as a common source of, or as a possible link between, subjective wellbeing and ecological responsible behavior, respectively. Publication 6 went a step further by assuming that mindfulness improves wellbeing. This increased wellbeing, so the overarching hypothesis, might then reduce reliance on consumption behavior to fulfill affective or symbolic needs, often expressed in compulsive consumption behaviors. Publication 6 posed 5 research questions that were to be answered in 3 partly independent studies. Due to the limitations of our paper’s scope, the analysis has been confined to discuss only the main aspects of these studies. Publication 1 additionally considered the role of non-materialistic values such as relationships, personal growth and community feeling. Publication 2 considered mindfulness as a direct precondition for sustainable behavior, testing the idea that as long as behaviors are not the norm or automated default option, mindfulness might support conscious choices for the deviating, here: sustainable behavioral option. Publication 3 followed up on a mediation hypothesis that was proposed in an ad-hoc manner in publication 2: the hypothesis that the apparent link between mindfulness and sustainable consumption behavior might rest on a mediating positive effect of increased connection with or sense of belonging to nature. Publication 5, the earliest one, is rooted in the conceptual background of deep ecology and followed a reverse logic. The study investigated mindfulness experiences as a consequence rather than a precondition for a sustainable lifestyle and looked at the role of feeling as a part of nature within this context. This approach is similar to the premise of publication 7 which also took a sustainable lifestyle choice (eating organic food) as the starting point and looked at possible effects on the development of mindful eating habits and, more generally, effects on subjective wellbeing.

In six of the seven publications, two covariates played a recurring role, namely subjective well-being, as a co-outcome or mediator of mindfulness and sustainable behavior (1, 4, 6 and 7), and connectedness to / being part of nature (3 and 5), as a possible mediator between mindfulness and sustainable lifestyles.

(2) Understanding and measurement of mindfulness

Publications 1 and 2 used very similar concepts of mindfulness defined as a “quality of consciousness that denotes a receptive attention to and awareness of ongoing internal states and behavior” (publication 1, cf. Brown and Ryan, 2003) or, very similarly, as the capacity of self-regulating attention and the skill of observing and accepting sensations, thoughts or emotions
as they occur (publication 3, cf. Bishop et al., 2004). Publication 3 elaborated very little on the underpinning concept of mindfulness. Instead, it focused on the empirical question proposed in publication 2. Publication 6 expanded thoroughly on the concept of mindfulness and its Buddhist origin concluding with Kabat-Zinn’s (2003: 145) definition of mindfulness, as “the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience”.

In order to operationalize mindfulness, the four publications used two different, but conceptually overlapping psychometrically validated instruments, the MAAS (Mindful Attention Awareness Scale, Brown and Ryan, 2003), and the FFMQ (Five Facets Mindfulness Questionnaire, Baer et al., 2006), or subscales of the latter. The FFMQ has been constructed as a combination of various earlier scales, including the MAAS, which shares a wide conceptual and item overlap with the third of the five subscales:

1. Non-reactivity to inner experience
2. Observing sensations
3. Acting with awareness (similar to the MAAS scale)
4. Describing /labeling with words
5. Nonjudging of experience

Whereas only publication 3 used the complete FFMQ scale including all five facets (39 items), publication 2 used only the subscales Observing sensations (8 items) and Acting with awareness (8 items), and publication 1 the complete MAAS (15 items).

Although publication 5 made use of a very similar concept of mindfulness based on the definition of Buddhist monk Hanh (1995: 204) “as the energy to be here and witness deeply everything that happens in the present moment, aware of what is going on within and without”, it derived a different set of seven “basic mindfulness experiences”: sense of wonder, union with nature, peace of mind, wholeness, joy, living in the present moment and being accepted in the universe.

Publication 4 focused on possible outcomes of mindfulness meditation instead of mindfulness as a dispositional personal difference and operationalized those as the experience of “mind slowing down”, “stillness”, “ability to see thoughts without being attached to them” and “watch emotions with being carried away by them”. The latter two abilities resemble the first facet “non-reactivity” of the FFMQ, whereas the former two aspects are unrepresented by the scale.

In general, it is noteworthy that all items used in the MAAS and most of the FFMQ “acting with
awareness” (AWA) are formulated negatively as e.g. “I rush through activities without being really attentive to them” as opposed to the positively formulated meditation outcomes how often respondents experienced “feeling of stillness”. Thus, the MAAS and AWA actually are self-rating scales of perceived inattentiveness to everyday experience, which is strongly correlated with a measure of cognitive errors, but often only weakly related to other mindfulness inventory measures (Grossman, 2011; Grossman and van Dam, 2011). Nevertheless, the rationale for the MAAS is based upon aspects of the Buddhist understanding of mindfulness (Brown and Ryan, 2003), and variations of attention are consistently considered aspects of mindfulness. The concept of “Mindful eating” used in publication 7 deviates from the aforementioned concepts, although is also loosely based on Kabat-Zinn’s definition, concentrating on the experience and sensitivity to nutrition-related body sensations. Thus, it is essential to keep in mind that the individual investigations often measure quite different characteristics that are purported to reflect the phenomenon of “mindfulness”, which is, indeed, complex and multifaceted.

(3) Understanding and measurement of sustainable consumption
Publications 1, 3 and 4 made use of very similar concepts of sustainable consumption, which they call Ecologically Responsible Behavior (ERB), Pro-environmental Behavior (PEB) and Environmentally Sustainable behavior (ESB). They all aimed at the measurement of behaviors that seek to harm the environment as little as possible in everyday life and thus measured an intention-based set of behaviors. Whereas publications 3 and 4 measured similar intentional behaviors to an comparable extent (publication 3: 11 items on typical domains such as recycling, choice of eco-friendly household products and sustainable nutrition; publication 4: 17 items including some of the former, plus transport and water/energy use items), publication 1 went beyond this in trying to additionally capture a part of real impact human behavior can have on its environment. The authors measured an overall score on ERB containing an 12-item ecological footprint questionnaire (Dholakia and Wackernagel, 1999), focusing on items of the three behavioral spheres food, transport and housing with the highest ecological impact, as well as a 54-item self-constructed scale based on a wide range of intentional behaviors including organic food consumption, leisure time activities, frugal consumption patterns, travel choices, recycling habits, waste reduction, and energy and water conservation. In marked contrast to this extensive assessment of ecological behavior, publication 2 employed a single-item assessment of “greenness” (authors’ original wording), where respondents were asked to assess how “green” they perceived themselves to be on 8-point Likert-type scale, ranging from “not green” (never choosing the most sustainable option) to “dark green” (always choosing the most
sustainable option regardless of cost in time, money, convenience or personal preference).

Publication 6 provided a detailed account of the concept of sustainable consumption and the varying perspectives taken by different disciplines before proposing a definition of “mindful consumption”, which contains sustainability aspects, such as frugality (reduced consumption) and consumption within a perspective of pro-social and pro-environmental factors. In order to operationalize these concepts, the author used two quantitative measures: a short 6-item pro-social and environmental behavior scale, loosely based on Pepper et al. (2009) and an 11-item compulsive-buying scale by d'Astous et al. (1990), focusing on the excessive and uncontrolled purchase of unnecessary goods.

Publication 5, with its deviating research question set in the deep ecology context of the 1990’s, conceptualized sustainable consumption as “back-to-the-land-values”, which include concepts such as foregoing high-tech consumption (computer, CDs or video cameras), soft technology (using human power instead of mechanical or electrical power, e.g. walking instead of driving) and a lifestyle of voluntary simplicity (e.g. possessing fewer things, reducing energy consumption).

The starting point of publication 7 was the sustainable behavior of organic food consumption. The authors, however, neither went into detail about the specific definition they applied nor about a general definition or explanation of sustainable consumption.

(4) Study design, methods and samples

Study Design and Method: Four of the five quantitative publications and one sub-study of publication 6 employed a cross-sectional design and computed correlation or regression analyses with sum scores derived by the varying quantitative scales described above. With the exception of publication 1 that used structural equation modeling (also based on sum scores for partial scales instead of single items), the publications treated the constructs as manifest ones, using simple sum scores of either overall measures or individual subscales to compute correlations or regressions. Only studies 6b and 6c evaluated the effects of meditation practice with a quasi-experimental pre-post design (Reichardt, 2009).

Publication 7 is based on 10 semi-structured interviews preselected from a larger sample of interviews that followed a descriptive phenomenological approach. Sub-studies 6b and 6c employed a mixed methods approach to enable triangulation. The researcher took a weak social constructionist epistemology, which allowed the use of multiple methodological approaches to fit the complex research design (multiple research questions - multiple studies with different
methods and different analytical tools).

Samples: In only two of the six quantitative publications the research question is approached using a sample derived from the general population. Most studies made use of pre-selected samples with a sustainability-related selection criteria (ecology-fair visitors, simple lifestylers, back-to-landers, organic food consumers, environmental activists or compulsive buyers). Two correlational studies (publication 4 and 6a) made use of samples with meditation experience, and another study employed a sample that was pre-selected with regards to both research constructs, mindfulness and sustainability (publication 4: Buddhist peace fellow members with an emphasis on sustainability). No study made use of a representative sample.

4.2 Empirical results

This section presents our analysis of the findings that the studies report. It is structured according to the previously mentioned four potential mechanisms by which mindfulness has been proposed to promote sustainable consumption (see Table 2). Results related to other possible mechanisms regarding the connection between mindfulness and sustainable consumption were not identified. Table 5 provides an overview of the empirical results identified in the review.

(1) Disruption of routines

Publication 2 found a positive relationship (β = 0.37) between the mindfulness facet ‘acting with awareness’ (AWA) and the ‘greenness’ of people. Although non-sustainable routines were not explicitly tested in the article, the authors provided the interpretation that increased attentiveness helps individuals to more consciously consider behavioral options, instead of acting by societal default (which is often not sustainable).

Publication 6a found a modest relationship of AWA with compulsive buying only, but not with pro-environmental behavior. Correlations of the overall FFMQ measure with compulsive buying (r= -.218) and environmental behavior (r=. 166) were small. The positive effect of
Table 5. Quantitative and qualitative results in the categories of identified potentials of mindfulness for sustainable consumption

<table>
<thead>
<tr>
<th>Nº</th>
<th>Disruption of routines</th>
<th>Congruence (with regard to the attitude-behavior gap)</th>
<th>Non-materialistic values and wellbeing</th>
<th>Pro-social behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>-</td>
<td>Mindfulness and intrinsic values are seen as joint predictors for environmentally responsible behavior and subjective wellbeing</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Mindfulness helps to consider behavioral option consciously</td>
<td>(discussed, but not measured)</td>
<td>Mindfulness increases connectedness to nature, this in turn enhances pro environmental behavior</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>-</td>
<td>Environmentally sustainable and mindfulness meditation seen as two related predictors of subjective wellbeing</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mindfulness is one expression of downshifting and simple back-to-the-land values</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>6a (quant)</td>
<td>Mindfulness disrupts compulsive consumption patterns</td>
<td>-</td>
<td>Mindfulness negatively related to material values and positively related to life satisfaction</td>
<td></td>
</tr>
<tr>
<td>6bc (qual)</td>
<td>Mindfulness leads to less compulsive consumption patterns</td>
<td>Greater likelihood to engage in behavior more in line with their attitudes</td>
<td>Strengthening of values caring for the wider ecological and social worlds in consumption decisions. Negative effects on materialistic values. Improved self-regulation, increased overall awareness as well as specifically with one's own body and compulsive buying related behavior</td>
<td>Rise in reported empathy and moral concern for others, beyond the close social circles of participants</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>Mindful eating broadened thought-action repertoire and stimulated embodiment</td>
<td>Increase in well-being as well as vitality and resilience</td>
<td>Rise in perceived self-compassion</td>
</tr>
</tbody>
</table>
reduced inattention on compulsive buying behaviors could be regarded as one instance of interrupting a highly habitualized ‘compulsive’ behavior.

The overarching goal of publication 6 (with sub-studies a, b and c) was to explore the relationship between mindfulness and consumption. The study finds mindfulness to be associated with increased overall awareness as well as specifically related to one’s own body awareness and to compulsive buying-related behavior. Key to breaking habitual behavior (in study 6b and 6c) was the increasing sense of awareness through mindfulness training, which in turn enabled participants to make a choice regarding their response to routine behavior and to compulsive buying impulses (study 6c). Concerning the group of compulsive buyers, the author also stated that the measured rise in emotion-regulation abilities, alongside an increased emotional wellbeing, potentially reduced the affect-related shopping habits.

(2) Congruence (with regard to the attitude-behavior gap)

None of the quantitative studies framed their research as an explicit investigation of the attitude-behavior gap, although publication 2 discussed this possibility without having included an explicit attitude measure.

In publication 6, even though the attitude-behavior-gap is also not explicitly examined, study participants, who were compulsive shoppers, reported an increase in perceived behavioral control, grounded in a growing awareness of their habitual responses. They also demonstrated a greater likelihood to follow through with their plans concerning shopping behavior, acting more in line with their attitudes. The author relates those results partly to a “lowered discrepancy between actual and ideal selves” through increased mindfulness levels (p.376). Similarly, publication 7 stated that study participants who apply mindfulness-oriented practices to their eating behavior report a sense of “bodily intelligence with moment-to-moment awareness” (p. 6). Although no explicit reference was made to greater coherence between attitudes and behaviors, the authors suggested that an effect may exist toward synchronizing attitudes and behaviors when they reported how increased attention to the everyday experience of mindfully consuming food enriched the participants’ “sphere of lived
reality” (ibid.) and broadened their “thought-action repertoire” (ibid.), mainly by embodying practices and decoupling them from cognitive processes.

(3) **Non-materialistic values and wellbeing**

Five of the six quantitative publications drew explicitly on the relationships between mindfulness, (non-material) values and subjective wellbeing. In publication 1, the positive relationship between mindfulness-related attentiveness *(MAAS)* and pro-environmental behavior *(β = 0.22)* was considered as one path of a model that conceived of inattentiveness and non-material values as joint predictors for the parallel outcomes of environmental behavior and subjective wellbeing. Publication 3 found modest, but significant, relationships in two studies *(β =0.19 and β =0.30)* between mindfulness *(FFMQ)* and pro-environmental behavior *(PEB)*. Additionally, it could show a strong mediation effect of connectedness to nature, substantially reducing the weight of direct paths between mindfulness and pro-environmental behavior in both studies, in study 2 to nonsignificance. Connectedness to nature, as an attitude measure with an emotional component, is different from, but related to biospheric values, where the protection of nature or the prevention of pollution are seen as guiding principles in life. Publication 4 investigated mindfulness meditation and sustainable behaviors as joint predictors for subjective wellbeing. It reported small positive correlations of the two concepts *(r= 0.15 for household consumption and r= 0.19 for food choices).* Publication 5 used different back-to-the-land values (simplicity, technology consumption, homestead production) to predict Buddhist mindfulness values and also reported relatively low weights *(β = 0.14- 0.22).* The importance of feeling part of nature stood out here as the strongest predictor for mindfulness values *(β =0.34, partly due to a conceptual confound, see below).* Adding to the effects on compulsive and sustainable buying, the quantitative study of publication 6 reported a small negative effect of mindfulness on material values *(r= -0.18)* and a small positive effect on life satisfaction *(r= 0.28).* In its qualitative parts, mindfulness was found to be associated with a clearer sense of identity and a strengthening of values concerning care for the wider ecological and social worlds in consumption decisions.
Publication 7 reported how young adults with a preference for organic food have used mindfulness practices and experiences related to their consumption of food to help them increase their well-being, vitality and resilience through “transcending to more enduring and positive emotional states” (p.6). Further improvements were reported with respect to the participants’ ability to manage stress and to set boundaries when acting mindfully in their relationship with food. Publication 6 reported improved psychological well-being and self-regulation (in compulsive buyers) after a mindfulness intervention, alongside improvements in self-esteem and self-efficacy. It also found mindfulness to be negatively related to both materialistic values and compulsive buying tendencies. Participants showed to have widened their perspectives of how to gain positive affect without turning to shopping, making it more likely for them to choose to engage in alternative activities.

(4) Pro-social behavior

Two qualitative studies, yet none of the quantitative publications referred to self-compassion, pro-social or altruistic behaviors. Publication 7 reported that mindfulness practices have contributed to an increase in perceived self-compassion as well as in the “sense of agency” (p.6) among young adults with a preference for organic food. Another result of publication 6 was that a rise in self-focused awareness was accompanied by increased self-reported empathy and moral concern for others, beyond the close social circles of participants.

5. Discussion

The discussion of the results of the literature review is divided in two parts, one on methodological issues and one on the results reported in the studies. For each part, recommendations for future research are provided. We conclude this section by discussing limitations of the review approach used in this SLR and by providing recommendations for future research in the field.

5.1 Discussion of methodological approaches

We begin by a critical appraisal of the quality of the quantitative and qualitative publications.
5.1.1 Quantitative studies

Concerning the quantitative studies, four outstanding methodological issues (corresponding to the analysis categories in the result section) will be discussed. (1) measurement instruments and aggregation level (relating to categories 2 and 3 in section 5.2), (2) designs & methods and (3) sampling techniques (category 4 in section 5.2) as well as (4) investigated variables (based on the research questions, category 1 in section 5.2). After discussing each methodological issue, we give recommendations for future research.

(1) Measurement instruments and aggregation level

The instruments used to assess both constructs of interest, mindfulness and sustainable consumption, vary considerably not only in scope, but also in focus. Turning first to mindfulness, the length of instruments alone illustrates the variety of assessment methods, ranging from 4 to 39-items scales. Even the two validated instruments employed differ significantly in scope and level of aggregation (1 vs. 5 facets with a higher-order general factor), and they have been both criticized for their construct validity (the MAAS for being too narrow in scope; the FFMQ including the “describing” subscale that is not unanimously considered a factor of mindfulness and the “observing” subscale not generalizable across different populations; for a critique, including other problematic aspects, see Grossman, 2011; Grossman & Van Dam, 2011). The set of mindfulness experiences used in publications 4 and 5 are a limited selection of items picked by the investigators that lack psychometric validation and are hardly comparable to the operationalizations used in publications 1-3, despite some conceptual overlap in face validity. Publication 5 uses items that may be considered a consequence rather than a constituent of mindfulness and do not appear in any other psychometric scale (e.g. “feeling of joy”, “sense of wonder”) or are confounded with other constructs (e.g. “sense of union with nature” vs. “importance of being part of nature”), which could lead to tautological explanation of results.

The same observation holds true for the assessment of sustainable consumption. The variety in scope is even more remarkable (1-item vs. 66-items) with a complete lack of validated
instruments. The only index of psychometric quality reported is Cronbach’s α. None of the publications reviewed explicitly discusses conceptual problems involved in assessing sustainable consumer behavior (e.g. assessing intention-based behavioral measures vs. impact-based ones) (Geiger, Fischer and Schrader, 2017). Some studies aggregate a few behaviors within a single domain (e.g. recycling), whereas others compute general measures over a range of different domains (e.g. purchase choices, housing, nutrition, transport). Rationale for selection of particular behavioral items is rarely provided, as if face validity of an item would be sufficient for its inclusion in a scale. Accordingly, most publications exhaust themselves in prototypical behaviors, such as purchase of eco-friendly household products, recycling or organic food choices (Watson et al., 2013), that are by no means the most relevant ones ecologically. Well-known high-impact ecological behaviors, i.e. housing style, eating meat and frequency of flights, are only considered in publication 1. Even in this most comprehensive scale, simple sum scores are used and items are not weighted according to their actual ecological or social impact. Also no further information on psychometric quality (as e.g. item loadings on general or sub factors, or over all fit measures) are given. Across all instruments used for the assessment of sustainable consumption, a strong bias for ecological facets of sustainability can be observed, with socio-economical aspects being largely marginalized and neglected.

Recommendation: For the consolidation of research findings, it is indispensable to replicate results with validated psychometric scales that adhere to a current scientific consensus of all concepts in question and were constructed according to methodological quality criteria. When estimating aspects of mindfulness, the most prominently used FFMQ or the newly developed CHIME Scale (Bergomi et al., 2013; Bergomi et al., 2014), each with a number of subscales, represent options (the MAAS is essentially made redundant by the FFMQ AWA subscale). It is important to report effects of subscales, not the overall scores and specifically to refer to the measures with their subscale names as reflecting aspects putatively related mindfulness, not mindfulness itself: No questionnaire scale has, to date, been empirically validated as measuring “mindfulness,” per se (Grossman, 2008; Grossman, 2011; Grossman
and van Dam, 2011). Furthermore, mindfulness subscale specification will result in a more precise analysis than relying on some global “mindfulness” construct that may not be closely related to other mindfulness operationalizations (Grossman and van Dam, 2011).

For sustainable consumption, a psychometric validation for the item collection used in publication 1 or the use of the validated Rasch-based General Ecological Behavior scale by (Kaiser and Wilson, 2004) could be options employed by future studies. In any case, the behaviors in the scales should be validated for their objective impact on sustainability thresholds by methods such as Environmental or Social Life Cycle Analysis based on objective criteria (e.g. ecological footprint, greenhouse gas emission, resource consumption, human rights, decent work conditions). Finally, the diversity and incommensurability of the instruments employed calls for a more transparent, well-argued selection of measures that clearly state what area of consumption, stage of consumption and sustainability impacts the study focuses on in its assessment of individual sustainable consumption (Geiger, Fischer and Schrader, 2017).

(2) Sampling techniques

The use of convenience samples from a biased population seems to be more widespread than desirable: five of the 6 publications made use of samples with a sustainability bias, whereas only publication 1 systematically employed this characteristic as a grouping variable. This approach imposes substantial threats, not only to external validity of results when trying to investigate relationship across populations. A further threat may be potential floor or ceiling effects in the targeted behavior, as may have been the case in publication 4, with high means and low variance in recycling habits and food choices, potentially attenuating results. What is interesting to note is that only publications 4 and 6a actually included individuals with mindfulness meditation experience. Given that the research interest here focuses on a Buddhist concept of mindfulness that requires cultivation and enhancement over time by means of meditation practice, the underrepresentation of a meditating subsample of the population is troubling. This may be all the more problematic, since mindfulness scales seem
to be differently semantically interpreted by people with vs. without meditation experience (Grossman and van Dam, 2011).

**Recommendation:** Replication studies with general population samples of all ages, socio-economic and educational status are needed. Additional investigations into the effects of meditation practice with neophytes and experienced practitioners are desirable (see next point).

**(3) Design & method**

All but two quantitative studies (publication 6b and 6c) used a cross-sectional, correlative design assessing levels of mindfulness and sustainable consumption at a single point in time. Correlational results are, of course, ambiguous as to the assumed direction of relationship. The only two intervention studies, where changes over two or more observation points in time were assessed, had severe methodological restraints that prevent even tentative interpretation of results (small or unclear n, comparison of a n=9 intervention group with a n=438 general population sample, no control group, no randomized assignment of participants, non-significant effects not reported).

**Recommendation:** (Quasi-) experimental designs with a sufficient sample size (depending upon estimated statistical power) and adequate control groups are needed with interventions that either influence the level of mindfulness (by means of programs of meditation practice) or the level of sustainability orientation (by means of programs informational or experiential interventions in nature etc.) and assess potential changes in the other variable. This is essential for evaluating causal relations between mindfulness and sustainable consumption.

**(4) Investigated variables**

Some of the reviewed publications made first attempts to examine possible mediating variables, such as *connectedness to nature* or potential mutual outcomes such as *subjective wellbeing*. Nevertheless, there is a whole array of still untested plausible mediators that bear a hypothetical connection to both mindfulness and sustainable consumption, such as
compassion, ascription of responsibility, personal norms, health orientation or time perspective, to name but a few (see also the discussion of potentially relevant facets in section 4). Moreover, other types of possible intervening relationships have not yet been considered, e.g. mindfulness as a potential moderator in the attitude – behavior gap.

Recommendation: Future studies should include more potential mediators and be open to as yet unconsidered types of roles for either of the two constructs in question, e.g. moderating roles for other relationships.

5.1.2 Qualitative studies

The evaluation of the three qualitative studies, publications 6b and 6c and 7, is based on five topics suggested by Fink (2009) to critically appraise the quality of the qualitative research reported: (1) specific research questions, (2) defined and justified sample, (3) valid data collection, (4) appropriate analytic methods, and (5) interpretations based on the data. Additionally, where appropriate, criteria from the quantitative analysis were also considered.

The two qualitative papers name research questions. Publication 7 refers to a larger former study with broader questions and focuses on two aspects of special interest within this broader scope. However, those sub-questions are rather imprecise and unclear, not fully fulfilling the criteria for specificity of research questions. Publication 6 raises one relevant overarching question with multiple, and more precise, subsidiary questions for each of the three sub-studies (6b/c) conducted (see Table 4 for exact wording).

The samples used were defined and justified in both cases; however, explanation and details provided in publication 6 are more substantial and precise than the rather abridged, and consequently not easily comprehensible, explanation given in publication 7.

Although publication 7 offers some explanation on its approach to data collection, the exact procedure remains vague, and the interview guidelines are not available. On the other hand, publication 6 offers a more detailed description of the development of the presented interview guideline(s) in relation to the underlying IPA approach. This deeper level of elaboration may
partly be attributed to the differences in scope allowed with the varying publication formats (journal article vs. dissertation).

Concerning aspects of appropriate analytical methods, publication 6 elaborates, to some degree, upon its application of a triangulation approach and relates the methods used to a comparative analysis. Even though the research presented in publication 7 is embedded in a broader study, it does not report any triangulation or attempts to cross-validate results with those from other parts of the study. The description of data analysis (see analysis chapter) and coding of publication 7 is sound, though more elaborate and extensive in publication 6; once again this difference between investigations may be due to constraints of the different publication formats.

Interpretations are clearly based on the data in publication 6 only. The themes presented in publication 7 are insufficiently supported by the reported data. Additionally, the authors conception of mindfulness seems less clearly operationalized than in other studies.

Recommendations: The methodological design of publication 6 is the only one included in our final sample that contains an intervention with pre-post-follow-up approach, as well as employing both quantitative and qualitative methods. Similar to our evaluation of quantitative studies, we recommend that future qualitative studies, rather than relying on cross-sectional, correlational approaches, employ prospective methodologies to examine how changes in one core construct (e.g. mindfulness) may influence another (e.g. consumption attitudes or behavior). For this purpose, the use of samples without prior mindfulness-meditation experience, ideally drawn from the general population, is also recommended for future qualitative research. Given the exploratory and introspective nature of mindfulness experiences, it seems fruitful to complement semi-structured with open interviews, in order to study the complexity of causal relationships between the two concepts. Furthermore, more prominent use should be made of qualitative methods for purposes of identifying unexpected effects (that could inform future quantitative research hypotheses) and in order to provide elaborated insights into the lived experiences of people influenced by variations in
mindfulness or consumption, something not possible with usual quantitative questionnaire data. Grounding qualitative studies within a sound methodological design that allows for clear data interpretation and the possibility of replication attempts, is a key proposition for the further consolidation of this relatively new field of research. The integrated use of both qualitative and quantitative methods in a mixed-method approaches using triangulation seem potentially fruitful for providing more holistic accounts of both the experiential and the measurable aspects of the potential relations between mindfulness and (sustainable) consumption.

5.2 Discussion of empirical results

The analysis of the studies’ results on the potential of mindfulness for SCR reveals existing research priorities and biases. So far, existing empirical research on the mindfulness-sustainable consumption nexus seems to have been focused on non-materialistic values and wellbeing as central constructs, with six of seven publications addressing this potential (see Table 5). A possible explanation for the prominent role of these constructs is that there is already a well-established body of literature on the effects of mindfulness on subjective wellbeing in which the emerging work on the role of consumption has been rooted. Likewise, mindfulness has been associated with distinct lifestyle orientations, such as downsizing and voluntary simplicity, which supports further explorations of the effects of mindfulness on non-materialistic values and non-detachment to material possessions.

In contrast to this, the potential of mindfulness to promote pro-social behavior has been widely neglected in the included studies, with only two out of seven reporting results in this domain. What is surprising is that the role of mindfulness as an antidote to the mode of ‘being on autopilot’ has been explicitly explored only in two of studies. This is particularly remarkable because it was this characteristic feature of mindfulness that was seen to constitute a major potential for breaking unsustainable consumption habits (as put forward by Rosenberg, 2005). This under-explored potential mechanism thus requires more systematic future research, particularly as one of the two studies that addressed this issue
employed a design unsuitable for its interpretation. What is also surprising is that none of the reviewed studies employed established theoretical frameworks, like practice theory (Brand, 2010) or the behavioral theories such as the theory of planned behavior (Ajzen, 1991), to investigate the attitude-behavior gap. While these established theories have limitations and epistemological incompatibilities with the concept of mindfulness, they may provide a fruitful starting point for exploratory studies on mindfulness in SCR.

A major limiting factor is that the studies only insufficiently discuss procedural aspects, namely the quality and nature of the mindfulness practices studied. Publication 7, for example, does not give any information on the specific mindfulness practices that the young adults engaged in, so the connections found remain vague and should be considered with caution.

Overall results (small, positive relationship between different mindfulness measures and different forms of environmental responsible behaviors) have to be interpreted with caution, as so many different measures have been used for either concept. If looked at on the detailed level of different mindfulness facets, results are partially contradictory (e.g. publication 2 found a medium effect for the subscale ‘acting with awareness’ and no effect for ‘observing’, while the opposite result was obtained in study 6a). Until specific, validly assessed, mindfulness-related measures have been replicated to demonstrate consistent effects upon sustainable behaviors, the existence of a stable direct relationship between the two concepts remains uncertain.

**Recommendations:**

The discussion of the apparent imbalances in the empirical investigation into the potential benefits of mindfulness for SCR call for intensified and more systematic future research efforts, in particular with regard to the possibilities that mindfulness may disrupt routines, improve congruence by reducing the attitude-behavior gap and/or promote pro-social behavior. Additionally, it must be acknowledged that all studies convey a somewhat individualistic focus on the connection between mindfulness and consumption. While this is
plausible given the interest in advancing a better understanding of how people experience mindfulness and relate it to their everyday consumption behaviors, it at the same time lacks a more social and cultural dimension of consumption (as a social practice, see Giddens, 2008). Another possible link between mindfulness and sustainable consumption could relate to the potential of mindfulness to instill changes at the collective level, e.g. by renegotiating shared conceptions of what ‘normal’ or ‘conventional’ standards are in current consumption practices and changing respective structures (Power and Mont, 2010). This topic represents a new field for future research.

5.3 Limitations of the review approach

The use of SLR methodology in this study has some limitations that need to be considered. Firstly, our search strategy has certain limitations: It was restricted to two selected databases and employed an extensive but not comprehensive search string. We may, therefore, have missed empirical studies dealing with mindfulness and sustainable consumption using different terminology and publication media. Secondly, the broad scope of our review resulted in a large proportion of publications that entered the initial sample to be irrelevant for the scope of this review. This produced a dropout rate of more than 97% (from initial to preliminary sample) or even 99% (from initial to final sample). While high dropout rates and small sample sizes of about a dozen publications or less are not uncommon for SLRs in the field of empirical mindfulness studies (see e.g. Hwang and Kearney, 2014; Souza et al., 2015), it seems advisable for future review studies in this field to revise the search strings used in this exploratory study in order to increase efficiency. Thirdly, this study emerged from the aspiration to substantiate the conceptually postulated potential mechanisms of mindfulness for SCR by means of a systematic investigation of the empirical evidence. Consequently, the analysis was informed by the prior identification of such postulated potentials. While we consider this a legitimate research interest and a valid approach, it would have, nevertheless, been possible to apply a more open approach and identify themes more inductively in the final sample of publications. Future review studies using such a more qualitative approach might provide a fruitful comparison to our work grounded in
theoretically postulated potential mechanisms of mindfulness.

5.4 Recommendations for future research

A number of implications can be derived from the findings of this review to provide recommendations for future research in the field (see Fig. 2). In a methodological perspective, the review revealed a number of caveats that imply that the results reported require careful evaluation. Taking into account that mindfulness is a competence to be developed slowly over time, strong effects on sustainable consumption are only to be expected over the course of months or even years, ranges of time untested in any of the reviewed studies. Not only are long-term studies necessary, but the amount of rigorous research at the nexus of mindfulness and SCB, in general, must increase in order to determine whether mindfulness intervention programs could be of benefit in this domain. Intervention designs must comprise longitudinal assessments of shorter- and longer-term mindfulness practice, because cross-sectional correlation analyses are subject to numerous kinds of biases (e.g. unsubstantiated assumptions about direction of causality). Another urgent issue is the development and use of validated assessment instruments so that research from different studies can be compared and integrated. Mindfulness remains a rather diffuse concept in the empirical literature. In light of this, it is essential that validated subscale measures associated with mindfulness are specifically reported, instead of summary measures with questionable content validity.

Figure 2. Recommendations for future research in SCR on mindfulness
Based on the pioneering studies reviewed, future work in this area should seek to explore and utilize systematic mixed-methods approaches. With regard to methodological rigor, such studies should favor randomized-controlled research designs that include control groups and draw from the general population, independent of their predisposition to practice either sustainable consumption, mindfulness or both. Future qualitative research should go beyond content or thematic analysis and explore and utilize the richness of sophisticated qualitative methodologies that allow for deeper insights into mindfulness experiences, for example, hermeneutic analysis. In our view, only the empirical orientation described above will allow us to evaluate whether meaningful changes in patterns of more sustainable consumption can be promoted by cultivation of mindfulness.

In addition, our review revealed a strongly individual-centered focus in publications that explored relations between mindfulness and consumption, whenever having attempted to measure mindfulness. Virtually all mindfulness questionnaires are exclusively self-referential in nature (i.e. they exclusively make reference to oneself or one’s own experience). Consequently, there is a danger of limiting the definition of mindfulness in SCR to the narrowly confined grounds of how open, aware, attentive and tolerant one perceives oneself to be. Not only does such a definition prevent the contextualization of mindfulness in more broadly integrative approaches to SCR (Haanpää, 2007), but it also falls far short of embracing the overarching ethical dimensions inherent in the Buddhist conception of mindfulness as antidote to general human inclinations toward greed, aversion and delusion. Elucidating the extent to which such ethical aspects are fundamentally embodied in mindfulness practice derived from Buddhist psychology (Grossman, 2015) might have significance for understanding how mindfulness could contribute to transformations in attitudes and behavior related to sustainable consumption.

Additionally, studying and promoting mindfulness solely as a facilitator of individual behavioral changes towards sustainable consumption run the risk of relegating responsibility primarily onto the individual as consumer in an unreflected way (Henkel and Andersen, 2015). In light of these caveats of existing studies found in this review, future research on the
nexus of mindfulness and sustainable consumption is needed to convey a broader perspective on both the individual and the collective dimensions of mindfulness in relation to sustainable consumption.

6. Conclusion

This SLR relating mindfulness and sustainable consumption shows preliminary evidence for characteristics associated with mindfulness to be subtly, but consistently, correlated with measures of individual sustainable consumption behavior. Most of the results obtained with cross-sectional studies revealed small, but stable, effects over a range of different sustainability behaviors. The most comprehensively researched potential role of mindfulness is its capacity to reduce materialistic values and promote wellbeing, for which a number of studies report evidence. Other possible influences of mindfulness, e.g. in terms of its hypothesized functions as a disruptor of routines, promoter of pro-social behavior and reducer of the attitude-behavior-gap were only addressed by single studies. However, the results tentatively suggest positive associations here, too, although also small in magnitude. Thus, researchers in sustainable consumption should feel encouraged by this study further to investigate facets of mindfulness as potential facilitators of sustainable consumption behavior. Our findings, however, also indicate the need for more sophisticated and rigorous qualitative, quantitative and mixed-methods research approaches that use validated instruments, and longitudinal and intervention designs, as well as more diverse population samples.

Appendix A

In SCOPUS, the search string used was: TITLE-ABS-KEY ( mindful* AND (sustainab* OR environment* OR ecologic* OR ethic* OR green* OR natur* ) AND ( consum* OR behavio* OR lifestyle* OR shopping OR purchas* OR buy* OR sufficien* OR ( needs AND satisf* ) OR eating OR recycling OR cloth* OR textile* OR food ) ).
In ProQuest, the search string used was: ALL ( mindful* AND ( ( sustainab* OR environment* OR ecologic* OR ethic* OR green* OR natur*) AND ( consum* OR behavio* OR lifestyle* OR shopping OR purchas* OR buy* OR sufficien* OR ( needs AND satisf*) OR eating OR recycling OR cloth* OR textile* OR food ) )
References


Methodentriangulation in der qualitativen Bildungsforschung [methods triangulation in qualitative educational research]. Budrich, Barbara, Leverkusen, pp. 41–63.


Topic "From Knowledge to Action – New Paths towards Sustainable Consumption". Oekom, München, pp. 113–142.


Leiberg, S., Klimecki, O., Singer, T., 2011. Short-term compassion training increases prosocial behavior in a newly developed prosocial game. PloS one 6, e17798.


ii. Education for Sustainable Consumption through Mindfulness Training: Development of a Consumption-Specific Intervention


Abstract

Several widespread approaches to Education for Sustainable Consumption (ESC) have emerged from the tradition of consumer information. A major shortcoming of such cognitive-focused approaches is their limited capacity to facilitate reflection on the affective processes underpinning people’s engagement with consumption. More holistic pedagogies are thus needed to increase the effectiveness of ESC. The concept of mindfulness has received growing attention in research on sustainable consumption recently, given its potential to address both cognitive and affective processes and to stimulate reflection on the drivers of often routinized consumption practices. Despite this recent interest, mindfulness has to date not been systematically connected to ESC. This paper provides a reflexive case study of the development of a mindfulness-based intervention (MBI) specifically tailored to ESC (“BiNKA-training”). It elaborates the conceptual connections between mindfulness and ESC, offers insights into the process of adapting a MBI to ESC and concludes with lessons learnt and an outlook on future work seeking to tap the potential of MBIs to inform more holistic approaches to sustainability education.

Keywords

Education for Sustainable Consumption; MBSR; Curriculum Development; Mindfulness; Ethics; Sustainable Consumption, Values; Intervention Desig

Aim of the Paper

This paper provides a reflexive case study of the development of a mindfulness training program specifically tailored to the context of Education for Sustainable Consumption (ESC), the so-called BiNKA-training. The training is a core element of the research and
development project BiNKA (German acronym for “Education for Sustainable Consumption through Mindfulness Training”) which set out to empirically investigate the relationship between mindfulness and sustainable consumption with an intervention study.

The first section of the paper provides some background by discussing the relevance of mindfulness for ESC. The second section describes the work in the foundational phase. A critical step in this phase of the development process was the selection of adequate components from the two fields of mindfulness-based interventions (MBIs) and ESC that were then to be assembled to create a consumption-specific MBI. The third section expands on how the findings of the previous phases were integrated and used to build, test and revise the prototype of the BiNKA-training. Following this, the final design and curriculum of the training is presented that has resulted from this process. The paper concludes by offering some critical reflections of the development process, lessons learnt in this transdisciplinary endeavor and ways forward for future work in this field.

**Mindfulness and Education for Sustainable Consumption: Making the Connection**

The nexus of education, consumption and sustainable development has been at the top of the agenda since the very inception of the political process towards sustainable development at the Rio conference in 1992. Today, 25 years later, both education for sustainable development (ESD) and sustainable consumption (SC) are prominently addressed as distinct Sustainable Development Goals (numbers 4 and 12) in the United Nations’ post-2015 agenda (United Nations 2015). Education for Sustainable Consumption (ESC) has emerged as a field of scholarship, policy and educational practice that aims to connect the discourses around consumer education, ESD and sustainable consumption (Adomßent et al., 2014). ESC extends the scope of traditional consumer education approaches that were guided by the ideal of the informed consumer and consequently emphasized awareness raising and the transmission of information and knowledge to foster individual behavioral change (McGregor, 2005). With ESC comes a greater appreciation of and engagement with notions such as civic agency and citizenship, ethical considerations (e.g. good life, responsibility) and the overall aim to strengthen the capacity of consumers to contribute to a broader societal
transformation towards sustainable development. This reorientation went alongside the development of more comprehensive learning outcomes that have been conceptualized as key competencies for sustainable consumption (Fischer & Barth, 2014; Rieckmann, Mindt & Gardiner, 2017). Key competencies as learning objectives in ESC seek to (1) nurture both cognitive, motivational and volitional dispositions, (2) are guided by the idea of critical, self-determined and self-reflexive individuals and (3) promote the capacity of learners to actively and responsibly contribute to advancing overall societal progress towards sustainability. To this end, it facilitates the deliberative processes underpinning social change, instead of simply pursuing behavioral change as a primary educational objective (for a more comprehensive discussion see Fischer & Barth, 2014). A major task for research in ESC is thus to advance learning settings that effectively address both cognitive and affective learning outcomes and promote a reflexive engagement with sustainable consumption challenges. Given the predominance of cognitive approaches in traditional consumer education, there is a strong need to advance a deeper engagement with affective processes in ESC.

Mindfulness has the potential to support this endeavor and strengthen ESC in multiple ways. It is defined here as the unbiased awareness that emerges through intentionally and continuously paying attention to subjective momentary experience with an open, accepting, benevolent, and compassionate attitude (Boehme et al., 2016). The concept of mindfulness has been increasingly researched in recent years, originally mainly in the clinical context, expanding into behavioral research (for more information see Bowen et al., 2006; Grossman, Niemann, Schmidt & Walach, 2004) and beyond science into multiple societal areas, e.g. education (see e.g. Mindfulness All-Party Parliamentary Group, 2015).

Generally, mindfulness is considered to bear the potential to bring together cognition and affection, thus extending and complementing dominating concepts of ESC. It is seen to encompass the reflection of individual values and actions in each given moment and therewith to potentially strengthen people’s ability to deliberatively focus their mind in a way that they become more sensitive for their own values, emotions and ensuing actions. This ability would promote the alignment of intentions with
actual behavior and consequently the adaption of actions towards more sustainable consumption patterns. The ongoing, mainly conceptual discussion of how mindfulness could promote positive changes in consumption behavior and support (E)SC will be summarized in the following four main potentials (for a more comprehensive review of the current literature see Fischer et al., 2017):

(1) Disruption of routines or switching off the autopilot (Grossman et al., 2004) by enhancing introspective capacities and thus providing the grounds for changing previously unconscious routines is a broadly recognized potential effect of mindfulness practice. For ESC this could mean that unconscious, non-sustainable consumption choices could be elucidated and diminished (Rosenberg, 2004; Bahl et al., 2016).

(2) Secondly, mindfulness practice is deemed to support an enhanced awareness of immediate daily experiences. In current research it has been shown to reduce self-perceived inattention to ones’ own behavioral patterns which is associated with the attitude-behavior-gap (Chatzisarantis & Hagger, 2007). That way, it is associated with a greater capacity to make more congruent choices that may potentially narrow the attitude-behavior-gap and support more sustainable consumption patterns (Ericson, Kjønstad, & Barstad, 2014; Rosenberg, 2004).

(3) Mindfulness practice may thirdly be conducive to the clarification of values and supporting the role of non-material values in people’s lives (Ericson et al., 2014). According to Buddhist psychology, mindfulness practice has the aim of counteracting unwholesome qualities (greed, delusion, aversion – which are frequently referenced in sustainability literature, too) by cultivating openness, generosity, kindness and mental clarity (Grossman, 2015). The fostering of such benevolent attitudes is also thought to increase individual well-being, which in turn is associated with an increase in intrinsic and socially oriented values and behavior and a decrease in materialistic,
hedonistic values (Kasser et al., 2014; Burroughs & Rindfleisch, 2002; Richins & Dawson, 1992).

(4) Lastly, the fourth potential refers to recent findings according to which pro-social behaviors are explicitly increased through meditation practices (Lim, Condon & DeSteno, 2015; Leiberg et al., 2011). This process is seen to be initiated through the development of compassion (especially in other-oriented techniques such as loving-kindness/metta meditation) (Condon et al., 2013). Pro-social behavior is consecutively positively linked to pro-environmental intentions and behavior (Pfattcheicher et al., 2016; de Groot and Steg, 2008; Steg et al., 2014, in Fischer et al., 2017).

Despite the apparent conceptual connections and the increased interest of researchers, the potentials of mindfulness for (E)SC so far remain a scarcely researched area (Rosenberg, 2004), even less so when it comes to intervention studies (Fischer et al., 2017).

Laying the Ground

In the initial phase of development, both existing MBIs and potentially suitable ESC-formats were screened and reviewed to identify solid foundations to build the BiNKA-training on.

Mindfulness-Based Interventions

In recent years, numerous mindfulness-training formats have been conceptualized. One of the first tasks in developing the training was to analyze existing formats with regards to their suitability to serve the objectives of the proposed intervention. This analysis was predicated on seven criteria elaborated by the research team (see Harfensteller, 2016, for a more detailed discussion of the process). The MBI to be chosen should

(1) be empirically tested and validated
(2) be multiple-weeks-long with daily individual practice as well as one longer session to account for the need of a regular meditation practice to induce physiological changes (Carmody & Baer, 2008)

(3) have a clear focus on mindfulness meditation instead of multiple/other meditation techniques, e.g. transcendental meditation

(4) contain mostly exercises and practices that include experience-based knowledge and are highly applicable to and integrable into participants day-to-day-life (daily-life focus)

(5) provide the possibility for thematic combination of meditation practice with the topic of (sustainable) consumption (especially food and clothing) to allow for the integration of ESC elements (consumption focus)

(6) incorporate both cognitive and affective training units for key competencies that are deemed relevant to experienced meditation teacher as well as current research on the topic of ESC (Carmody & Baer, 2008; Ericson et al., 2014; Fischer & Barth, 2014) (BiNKA-training focus)

(7) be specific to the projects target groups (secondary school students, university students, employees) or be easily adaptable to them.

Table 1

Examples of MBIs evaluated with a selection of criteria for the BiNKA curriculum

<table>
<thead>
<tr>
<th>MBI</th>
<th>MBSR</th>
<th>MBCT</th>
<th>MSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Mindfulness-Based Stress Reduction</td>
<td>Mindfulness-Based Cognitive Therapy</td>
<td>Mindful Self-Compassion</td>
</tr>
<tr>
<td>Author/year</td>
<td>John Kabat-Zinn/1979</td>
<td>Zindel Segal &amp; Mark Williams/2008</td>
<td>Kristin Neff &amp; Christopher Germer/2015</td>
</tr>
<tr>
<td>Source</td>
<td>umassmed.edu/cfm</td>
<td>oxfordmindfulness.org</td>
<td>centerformsc.org/meditations</td>
</tr>
<tr>
<td>Objective</td>
<td>Secular stress-reduction program, based on the</td>
<td>Program for people with psychological illness,</td>
<td>Program to develop self-compassion and emotional resources for</td>
</tr>
<tr>
<td></td>
<td>four pillars of traditional mindfulness practice</td>
<td>mainly depression, based on MBSR</td>
<td>healthy people, loosely based on MBSR</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------</td>
<td>----------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td><strong>Time requirements</strong></td>
<td>8 sessions à 2.5-3 hrs, 1 session 4 hrs, 45 min. individual practice, 6 times a week</td>
<td>8 sessions à 2.5 hrs, 1 session 4 hrs, 45 min. individual practice, 6 times a week</td>
<td>8 sessions à 2.5 hrs, 1 session 4 hrs, 30 min. individual practice, 7 times a week</td>
</tr>
<tr>
<td><strong>Consumption focus</strong></td>
<td>Mindful eating exercise on the Day of Mindfulness</td>
<td>Not observed</td>
<td>Not observed</td>
</tr>
<tr>
<td><strong>Daily-life focus</strong></td>
<td>Diary of pleasant and unpleasant daily situations</td>
<td>Exercise “Walking the street” mindfully, group reflection</td>
<td>Exercise “Promise to myself”, reflect on priorities in every-day life and learn to focus on them</td>
</tr>
<tr>
<td><strong>BiNKA-training focus</strong></td>
<td>(1) Self-acceptance, trust and gratefulness are repeatedly addressed (2) Exercise to eat a meal mindfully and observe what you really need</td>
<td>Not observed</td>
<td>(1) Feelings and dealing with (difficult) feelings is at the core of the training, (2) Raising awareness of one’s own needs</td>
</tr>
</tbody>
</table>

Mindfulness-Based Stress Reduction (MBSR) was chosen as the format most suitable according to the selection criteria. The program was developed 1979 at the Center for Medicine, Health Care and Society of the Massachusetts University Medical School by Jon Kabat-Zinn, originally for the treatment of chronic pain patients. It runs for 8-10 weeks, with typically a single 2.5 to 3 hours group session a week, one additional all-day session and individual 45-min daily meditation practice, mindful yoga exercises, and informal mindfulness in daily live (Kabat-Zinn, 1991).

The format is the most widely used and validated in mindfulness research to date and its effects have been repeatedly confirmed in multiple studies with healthy and clinical
populations (Grossmann, 2004; Creswell, 2017). In light of this, the MBSR format was considered a solid benchmark for effective mindfulness trainings. Furthermore, despite its secular focus, it is closely aligned with the traditional Buddhist understanding of mindfulness and comprises all conventional mindfulness practices (Kabat-Zinn, 2011). Another reason for prioritizing MBSR over the other available formats is the program’s suitability for more than one target group as well as the possibility for adapting it to different thematic contexts. As shown in the development of Mindfulness-Based Cognitive-Therapy (MBCT, Teasdale et al., 2000), it is possible to accommodate didactic and content in the MBSR program structure without compromising the major aim of developing mindfulness competency.

**Education for Sustainable Consumption - Formats**

The development of the BiNKA-training was further informed by a review of different ESC formats (Fischer, 2016). Rather than achieving comprehensiveness, the review sought to identify different educational formats that could be of use for adapting a general mindfulness training to the specific thematic and institutional contexts of the BiNKA-Training. In the review, educational formats were defined as distinct practical approaches that are used in pedagogical work to foster learning processes in the field of sustainable consumption. Such practical approaches may comprise assignments, exercises and other learning activities that include specific requests to learners. Educational formats were considered as relevant when they were compatible with:

1. the distinct time limitations imposed by the format of an 8-week mindfulness training,
2. the thematic scope of the mindfulness training that was focused on needs reflection and personal development as well as on consumption in the areas of food and clothing,
3. the distinct populations targeted in the BiNKA-training (secondary school students, university students, employees), and
4. the competence orientation of the mindfulness training that focused on awareness, reflection and sensations.
Educational formats were collected from the two most prominent strands in ESC: consumer education and ESD. Data was collected from two popular German reference databases for learning materials from both strands (www.bne-portal.de and www.materialkompass.de). The selected formats were then clustered according to two aspects: their thematic focus (happiness and needs, food and clothing, consumption and advertising and personal development) and the competencies primarily addressed by the formats (awareness for problems and one’s individual impact on these, personal values, norms and needs and aspects of external and self-determination). The clusters were not meant to be distinct, but rather indicate emphases in the materials reviewed. As a result of the review, several educational formats from the field of ESC with different thematic and competence-related foci were identified (see examples in Table 2).

Table 2

*Examples of potentially relevant ESC educational formats for the BiNKA curriculum*

<table>
<thead>
<tr>
<th>Educational format</th>
<th>Needs analysis</th>
<th>Food diary</th>
<th>Brands make friends</th>
<th>I am OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Group exercise</td>
<td>Written task</td>
<td>Creative design</td>
<td>Self-reflection</td>
</tr>
<tr>
<td>Objective</td>
<td>To reflect human needs and strategies of needs satisfaction</td>
<td>To document nutrition behavior and reflect on it</td>
<td>To raise awareness of how branding has been internalized</td>
<td>To gain confidence in one’s own capabilities</td>
</tr>
<tr>
<td>Description</td>
<td>Learners work on guiding questions to identify strategies used to meet needs</td>
<td>Learners observe and record their eating practices for a defined time period.</td>
<td>Learners dress a person on paper with branded fashion items and discuss about it</td>
<td>Learners describe positive changes accomplished from a future retrospective</td>
</tr>
<tr>
<td>Time requirements</td>
<td>90 minutes</td>
<td>60 minutes</td>
<td>25 minutes</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>
Developing the BiNKA-training

As the development of the training went through numerous stages that might prove relevant for further development of similar interventions, the following part describes the decisions that have informed the design of the final curriculum in some greater detail. After that, the final curriculum is presented.

Development: Finding the Balance

A major challenge in the process of developing the training was to find the balance between mindfulness elements (both cognitive and affective) and ESC elements (that are mostly cognitive-based) without compromising neither the key practice of mindfulness, nor the educational requirements of ESC (see Figure 1).

<table>
<thead>
<tr>
<th>Competence focus</th>
<th>personal values, norms and needs</th>
<th>awareness for problems and one’s individual impact on these</th>
<th>aspects of external and self-determination</th>
<th>personal values, norms and needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thematic focus</td>
<td>happiness and needs</td>
<td>food and clothing</td>
<td>consumption and advertising</td>
<td>personal development</td>
</tr>
</tbody>
</table>

**Figure 1.** BiNKA-training on the spectrum between mindfulness and ESC
The initial consideration of potentially valuable ESC elements for the BiNKA-training as well as the most suitable foundation of a mindfulness program was subject to a thorough discourse in the transdisciplinary project team. Psychologists, ESC and sustainability experts as well as mindfulness experts from both theory and practice discussed the preliminary results of the reviews of the prior development phase and mutually decided on keystones for the subsequent development steps.

A persistent controversy was surrounding the question of blending and balancing ESC and mindfulness elements. On one side of the controversy was the assumption that adapting the training too little and remaining too close to “pure mindfulness” would hardly impact consumption-related attitudes and behaviors. On the other side it was argued that adapting the original MBSR format too much toward a “pure ESC” training would diminish the benefits associated with a certain intensity of mindfulness training and a reliance on regular and consistent practice. What was agreed upon was that the explicit intention of the training was to make people consume in a more sustainable way, according to their own consumption-related values. The mean for propelling that change was primarily the cultivation of introspective capacities, potentially leading to an increased awareness of one’s needs and (partially unconscious) consumption patterns. A risk was seen in the provision of too overtly consumption-related information, as this may potentially confound these intrinsic values with extrinsic normative ideas. Moreover, there would have been a risk of participants perceiving the training as intrusive, or even manipulative, in the sense that they felt pushed to consume in a certain way when presented with a lot of fact-based ESC input. Consequently, it was decided to limit the conveyance of such input within the training to a minimum. Another aspect in support of this decision refers to the evaluation of possible effects of the training. A high dose of ESC fact-based input would have made it impossible to attribute measured changes in consumption behavior to mindfulness practice. But as the main objective underpinning the research project was to elucidate the potential of mindfulness to promote the acquisition of key competencies and foster sustainable consumption, it was decided to orientate the training closer towards a classical mindfulness training than an ESC course.
Initial training blueprint

For the construction of the BiNKA-training, several adaptations of the traditional MBSR format were needed. Firstly, in order to meet the practical constraints of the target groups (especially the employees at their companies and the secondary school students at school), the sessions were shortened from 150 to 90 minutes as well as the daily practice from 45 to 20 minutes for adults and 15 minutes for secondary school students, respectively. Secondly, the selected ESC as well as consumption-specific mindfulness elements had to be included in the training. Thus, some MBSR-specific content had to be eliminated in order to make space for ESC elements in an already diminished time frame which led to a fundamental restructuring of the entire training. On the grounds of the initial analysis and the ensuing team debates, the MBSR teacher team developed a first detailed blueprint of the training, which was presented to the entire research team and, after minor adjustments, piloted in two settings (with university students and employees). After the completion of the pilot trainings, interviews were conducted with participants and the course teachers and the results were fed back and discussed with the team.

Revision and secession school training

At this point of revision, some elements were considered unsuitable and thus removed from the curriculum. An example for this is an exercise that exposed participants to photographs of factories with poults (consumption area of food) or female sewers working under insupportable conditions (consumption area of clothing), and asked them to observe their thoughts, feelings and body sensations. Other elements such as the task to go shopping in a mindful way turned out to be suitable for the context of the training and were kept in the curriculum and given more time if needed and possible. Thus, based on those findings and changes, the structure and timing of each session was refined again.

While initially the training with secondary school students (grade 10, aged 15 – 16) and adults was identical, it became clear during 2 test-runs that the school training required more fundamental and specific changes of the initial blueprint. This was due to the special
preconditions of the target group (adolescents) and the setting (implementing the training into the school context). For example, it showed effective to include a higher frequency of switching between sitting and standing/walking, as well as to allocate time during sessions to reflect on certain questions in written form as a preparation and basis for group discussions. The adaptation process was inspired by a literature review on mindfulness programs and formats especially for children and adolescents (e.g. Broderick & Frank, 2014; Kaltwasser, 2008; Meiklejohn et al., 2012; Rechtschaffen, 2016).

**Result: The BiNKA Curriculum**

The final BiNKA-training for all target groups comprises eight weekly sessions of 90 minutes and one longer session (“Day of Mindfulness”) of four hours. The training sessions build on one another and are intertwined in form and content. In the first half of the training, the sessions are more mindfulness-focused, whereas in the second half, they are more consumption-specific. The topics of the BiNKA-session are:

1. Introduction – What is Mindfulness?
2. Obstacles and Challenges in Meditation
3. (Dis-)Satisfaction and Other Similarities
4. Emotional Intelligence – Be Mindful With What You Feel
5. Desires and Needs – Open Up Towards Life
6. Compassion – Kindness Towards Myself and Others
+1 Day of Mindfulness – Discover the Silence Together
7. Mindful Consumption – To Have and To Be
8. A Mindful World – Inside Out

The topic of each session is addressed in “insight talks” between teacher and participants, reflexive dyads/triads or group discussions as well as in the guided meditation practice (see figure 2 for a more detailed overview of the different elements used in a prototypical session). Each session includes formal and informal mindfulness exercises. The formal mindfulness practice refers to a practice with a clearly defined procedure and time
frame and comprises different types of mindfulness meditation such as bodyscan, sitting and walking meditation with focus on the breath, and loving kindness/metta meditation. The informal mindfulness practice aims at transferring mindfulness into everyday life activities such as eating, shopping, showering, or walking. The “Day of Mindfulness” involves an intensive formal practice of mindfulness meditation as well as a mindful potluck meal in silence. In addition to the weekly training sessions, the participants are encouraged to practice formal meditation autonomously on a daily basis (20 minutes for employees and university students and 15 minutes for secondary school students) and keep a practice diary on their experiences and reflections. In order to support the participants in these autonomous practices, audio recordings of guided meditations are provided (see mindfulness-and-consumption.de for sample downloads). Moreover, the participants get a specific task to practice mindfulness informally at home (e.g. “mindful shopping”).

Figure 2. Elements of a prototypical BiNKA-session (proportions vary depending on session focus and group dynamics).
To give a more thorough impression of BiNKA-specific content, three concrete examples from different stages of the training are illustrated hereafter. The chosen examples are exemplary for (1) newly constructed, consumption-specific mindfulness exercises, (2) the fusion of an ESC format with mindfulness practice, and (3) the adaptation (e.g. deepening) of certain MBSR content to promote the ethical stance inherent in mindfulness considered relevant for sustainable consumption. Session 7 “Mindful Consumption – To Have and To Be” represents the most consumption-focused session of the BiNKA-training and is described in detail in appendix I.

(1) The homework „Mindfulness in Everyday Life: Mindful Shopping“ aims at facilitating the introspection and reflection of subjective (consumption-specific) behavioral patterns and invites the participants to go shopping with a conscious activation of all of their senses. Participants are asked to slow down their usual routine so that they are able to observe their body sensations, their thoughts, and feelings more closely in any given consumption situation they select (e.g. shopping for groceries or clothes). The participants are then asked to reflect on their observations and to write them down in their practice diaries (week 1).

(2) The exercise “Interdependence: A Pair of Jeans Travels Around the World” combines ESC and mindfulness and seeks to increase the participants’ awareness of the social and global dimensions of their personal consumption practices as well as their capacity to reflect on these dimensions. The participants are guided through the different stages of the production of blue jeans in a visual journey and constantly encouraged to be in contact with their sensory experience (e.g. the feeling of their pants on their legs) and other inner reactions (e.g. thoughts, emotions) (week 7).

(3) The practice of loving kindness/metta meditation has been more deeply embedded in the BiNKA-training than it is found in standard MBSR interventions. The reason for this is that the qualities addressed by these types of practices (namely benevolence and compassion) are closely connected to the reflection and transformation of one’s behavior and were thus deemed as crucial by the project team (see section 2). Metta meditation is introduced in two steps: first, the practice of embodied kindness and compassion towards oneself; second, expanding that practice by including others (peoples, living beings, nature). Besides the practice and reflection in the training
session, the participants are encouraged to read a text written by the trainer on “Mindfulness in Action – The Embodiment of Compassion” in the course handout as well as to practice the embodiment of compassion in their everyday lives (week 5 to 8).

**Critical Reflection and Lessons Learnt**

As described before, the BiNKA-training is a consumption-specific mindfulness intervention that was developed to contribute to the advancement of ESC by strengthening affective learning and exploring the potentials of mindfulness to inform changes towards more sustainable consumption practices. During the process of developing the training, certain aspects of the initial strategies proofed to be useful and were extended, while others turned out to be less helpful with regard to the overall purpose of the project. Two major lessons learnt are particularly relevant for the application of adapted MBIs within the framework of ESC and will be critically reflected hereafter: (1) emphasis should be laid on practices that stimulate participants’ engagement with their inner affective processes and help to elucidate these and make them accessible for reflection (e.g. through self-discovery and openly turning to individual ethical values, needs and behavioral patterns) rather than on external cognitive input; (2) for mindfulness practices to unfold their full and long-lasting potential for ESC, continuous practice and re-examination of consumption-related processes and experiences rather than a one-shot intervention are required.

**Rather affective and implicit than cognitive and explicit learning strategies**

*Focusing on introspection and self-discovery*

Steady voluntary personal engagement and comprehension are fundamental for any kind of affective learning (Nelson & Creagh, 2013; Bandura & Schunk, 1981). This holds especially true for introspection processes as they are very individual tasks, which cannot be guided nor observed beyond a certain threshold by any external entity/person. Furthermore, specific and ongoing training is required to acquire awareness of those – mostly unconscious – inner occurrences that inherently impacts everyday behavior and underlying bodily functions (Petitmengin, 2006). As Petitmengin states: "Our most immediate and most
intimate experience that which we live here and now, is also that most foreign to us and the
most difficult to access” (Petitmengin, 2006, p.230). The need to focus on supporting the
emergence of introspection/self-reflection and affective competencies to explore – and thus
become able to change - individual (consumption-related) values, attitudes and actions
proved to be an essential insight to take from the process of developing the training, far more
than was expected beforehand.

Promoting implicit ethical values of mindfulness

In contrast to affective learning and introspection, cognitive focused learning is more
concerned with the acquisition of external information and conscious thought processes
(Bandura & Schunk, 1981). Ethical or moral values conveyed in that way might trigger
resistance or superficial acceptance that does not change individual value systems. The
practice of mindfulness, on the other hand, envisages an ethical development based on
intuitive and affective understanding of what is right and wrong (Monteiro, Musten &
Compson, 2014). In traditional mindfulness and Buddhist teachings, the practice of
meditation and awareness of our body/mind experiences bear the intention to transform the
aforementioned unwholesome emotions and actions (namely greed, anger and delusion) into
wholesome or “right” emotions and ethical actions (namely generosity, compassion and
wisdom) (Grossman, 2015) in order to help alleviate suffering in oneself and the world. It is
notable, that, despite the minor stance ethical education took so far in contemporary
mindfulness research (Monteiro, 2016), Kabat-Zinn in the creation of MBSR stressed the
importance of MBIs to be grounded in a universal “dharma” understanding that is congruent
with Buddhist dharma, but not constraint by traditions (Kabat-Zinn, 2011). The aim of the
training was to support participants’ capacity to reflect on their needs and increase their
awareness of the ethical values they hold. Given this, it emerged as increasingly important in
the course of developing and focusing the training to consider the ethical dimension of
mindfulness more strongly throughout the course of sessions.
Long-lasting change through long-term practice instead of short-lasting change through short-sighted interventions

Behavior change takes time

One of the key characteristics of the BiNKA-training is its understandings of mindfulness that is rooted in the genuine ethical background of MBSR and mindfulness in Buddhism. According to this positioning, the aim was to stimulate reflection of intrinsic moral values and perceived inconsistencies in terms of attitude-behavior-gaps, rather than to induce short-term and likely superficial changes on the behavioral level. Radical shifts in consumption patterns based on self-reflected ethical values however may take time to realize – presumably more time than an 8-week-training course can provide. This does not mean that a consumption-specific mindfulness intervention is ineffective, but is important to consider when evaluating manifest behavioral effects resulting from participation in the BiNKA-training.

Mindfulness practice and SC knowledge: a hermeneutic circle

Consideration of personal needs, (sustainable) consumption patterns and ethical values will per se depend on the individual knowledge base of sustainable consumption of the individual. To put it the other way round: practice and experience in mindfulness are required to be able to develop the ability for advanced introspection and, thus, to recognize one’s own unconscious behavioral patterns in the area of (sustainable) consumption. As stressed, such awareness is pivotal for aligning one’s own behavioral patterns more closely to inherently held values. Little or no prior knowledge of sustainable consumption provide a less nuanced ground for reflection than more comprehensive understandings of the challenges inherent in consumption practices. Even though, as clearly stated above, there are good reasons to keep the conveyance of extrinsic consumption related values and cognitive ESC knowledge to a minimum, a reliance on “plain” mindfulness practice without a certain background for the introspection would not support ESC either. Thus, rather than to conceptualize (cognitive) knowledge of (sustainable) consumption (as a contribution of ESC) and the ability to reflect
on affective processes in one’s own consumption behavior (as a contribution of mindfulness) as two separate entities, both are more appropriately understood as interacting and potentially reinforcing each other as they evolve and mature. In light of this, a traditional one-time intervention may have only limited effects. Against this background and based on the experiences made in the development and implementation of the training, the project team concluded that it may be fruitful to integrate mindfulness and ESC over a longer period of time (while possibly less time-intensive and with a higher focus on individual practice) in a hermeneutic circle or spiral to further increase the potency of the intervention. This may also involve a more explicit ESC-oriented course prior or in parallel to the BiNKA-training instead of trying to minimize information about the inclusion of consumption-related content in advance of the training.

**Conclusion**

The starting point of this paper was that there is a need to overcome the predominance of cognitive approaches in ESC and to stimulate a more holistic engagement with affective processes in learners. The critical case study presented on the development and implementation of a consumption specific mindfulness training in educational settings provided some insights that may inform future work in the field. The task itself required a team of both researchers from different fields and practitioners experienced with guiding learners in mindfulness. The assembly of the team ensured that the development of the curriculum was informed by a rich and diverse body of different knowledge-backgrounds and that quality criteria from different fields were met. The process of co-designing the training also revealed that values act as a key concept in all related fields. Hence, future work on consumption-specific mindfulness trainings in educational settings may seek to further elaborate on the role of values and ethics. A possible next step could be to incorporate ethical education more explicitly as from a “right” mindfulness perspective, cultivating the “Noble Person” that transcends self-interest and lives for the well-being of others (Monteiro, 2016; Grossman, 2015). This may also benefit a deeper understanding of mindfulness (Bodhi, 2011) and help respond to the challenge that, if not adequately met, may limit the potential
of mindfulness for ESC. The challenge is the extension of the scope of mindfulness to the broader issue of social change and the reform of structures of systems of consumption and production. If mindfulness remains confined to the immediate inner world and to private consumption practices, it may effectively prevent the transformation of political and economic structures sustaining unsustainable consumption practices. Hence, a crucial task for the further elaboration of MBIs in ESC is to connect inner and outer worlds and individual and social change agency.
References


**Appendix I.**

Session 7 – “Mindful Consumption – To Have and to Be”
The seventh session of the BiNKA-training connects formal mindfulness meditation with its practical dimension and incorporates the reflection of questions like “What has mindfulness to do with my consumption behavior?” and “What does mindful consumption mean to me personally?” guided and facilitated by the trainer. Additionally and very importantly, the practice of loving kindness/metta meditation is deepened during the session and at home. The focus of the session is explicitly laid on the individual and the social/global dimension of mindful consumption. The cultivation of wholesome emotions (e.g. benevolence and compassion) instead of unwholesome emotions (e.g. greed and hatred) is shown as a way to establish an inner state of wellbeing and bliss, in contrast to the attempt to satisfy that need through excessive consumption and the accumulation of possessions. Moreover, light is shed onto the impact of one’s consumption decisions (e.g. “Interdependence: A Pair of Jeans Travels Around the World”) and the participants are encouraged to practice benevolent and compassionate behavior in everyday life.

Table 3. Procedure of session 7

<table>
<thead>
<tr>
<th>Element of session</th>
<th>Min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop-in: Feeling the clothes on the skin</td>
<td>3</td>
</tr>
<tr>
<td>Brief repetition of session 6 and introduction of session 7</td>
<td>2</td>
</tr>
<tr>
<td>Guided meditation (metta stage 2): benevolence and compassion with oneself and others</td>
<td>20</td>
</tr>
<tr>
<td>Feedback/reflection of meditation practice and homework in group setting</td>
<td>10</td>
</tr>
<tr>
<td>Mindful movement/relaxing the body</td>
<td>5</td>
</tr>
<tr>
<td>Informal exchange in dyads/triads: consumption behavior in the context of mindfulness</td>
<td>10</td>
</tr>
<tr>
<td>Feedback/reflection in group setting</td>
<td>5</td>
</tr>
<tr>
<td>Consumption-specific mindfulness exercise “Interdependence: A Pair of Jeans Travels around the World”</td>
<td>15</td>
</tr>
<tr>
<td>Feedback/reflection in group setting and interactive insight talk of teacher and participants: mindful consumption</td>
<td>15</td>
</tr>
<tr>
<td>Setting an intention; reference to homework and course handout</td>
<td>5</td>
</tr>
</tbody>
</table>
iii. Cross-fertilizing qualitative perspectives on effects of a mindfulness-based intervention. An empirical comparison of four methodical approaches


Cross-fertilizing qualitative perspectives on effects of a mindfulness-based intervention. An empirical comparison of four methodical approaches

Abstract

Objectives: Qualitative methods come along with specific methodological backgrounds and related empirical strengths and weaknesses. Research is lacking addressing the question of what it precisely means to study mindfulness practices from a particular methodological point of view. The aim of this paper is to shed light on what qualities of mindfulness different qualitative methods can elucidate.

Methods: Based on interviews stemming from participants of a consumer-focused mindfulness training (BiNKA), we undertook a comparison of four different analyses, namely Content Analysis (CA), Grounded Theory (GT), Interpretative-Phenomenological Analysis (IPA) and Discourse Analysis (DA).

Results: Independently applying the four methods on our data material led to the following findings: CA demonstrated that the training had effects on self-awareness, well-being and the development of ethical qualities and influenced pre-consumptive stages of participants; GT revealed the complex set of conditions determining whether and how the mindfulness training influenced the attendees; IPA highlighted the subjectivity of the mindfulness experience, suggesting that (1) different training elements have varying effects on participants, and (2) it is often not the meditation practice, but other course elements that
cause the effects experienced by the attendees; DA demonstrated that the course experience was influenced by subjective theories held by the participants. In particular, they showed typical strategies of rationalizing their consumption.

**Conclusion:** A pluralistic qualitative research assists in identifying blind spots and limitations of a single method, increases the self-reflexivity, and helps to arrive at a more comprehensive understanding of mindfulness practice or other processes of covert lived experience.

*Keywords:* mindfulness, qualitative, pluralistic qualitative research, reflexive methodology, sustainable consumption
In mindfulness research and practice, mindfulness-based interventions (MBIs) represent a field of tremendous interest that continues to receive growing attention. MBIs constitute a class of training programs in which the participant is asked to bring “awareness to current experience – observing and attending to the changing field of thoughts, emotions and sensations from moment to moment – by regulating the focus of attention” (Bishop et al. 2004, p. 232). Recent research has investigated the effects of MBIs in areas such as medicine (Didonna 2009), psychotherapy (Germer et al. 2016), education (Schonert-Reichl and Roeser 2016), economics (Le et al. 2014), sports (Birrer et al. 2012), and even the military (Jha et al. 2015). Additionally, dozens of systematic literature reviews and meta-analyses have summarized an overwhelming amount of individual studies, mostly confirming positive effects of mindfulness trainings on many different aspects, including health and well-being (Black and Slavich 2016; Goyal et al. 2014), emotion regulation (Hill and Updegraff 2012), attention and cognitive performance (Eberth and Sedlmeier 2012; Zenner et al. 2014), compassion and prosocial behaviors (Luberto et al. 2017), or sports performance (Bühlmayer et al. 2017).

In view of this attention, it is not surprising that MBIs have also become subject to critical appraisal (e.g. Van Dam et al. 2018). Quantitative measurements of mindfulness – constituting the majority of mindfulness-related publications (Van Dam et al. 2018) – have particularly come under attack by different scholars. For example, a meta-study by Goyal et al. (2014) identified several methodological flaws common to quantitative mindfulness-related research, including research biases, a lack of active reference groups, and insufficient attention to placebo. More generally, it is argued that the existing quantitative instruments (see for example Bergomi et al. 2013) are barely appropriate to do justice to its “multidimensional nature” (Grossman 2008, p. 407). They instead reduce mindfulness to specific qualities that may be associated with it, but which may also be attributed to other states and/or traits and do not capture the phenomenon, e.g. an ability to maintain attention or be emotionally nonreactive. In regard to its broader meaning, “clear objective and observable [e.g. behavioral, physiological or emotional] criteria of mindfulness are
unavailable” (Grossman 2008, p. 407), implying that mindfulness practice is experienced very differently from one person to another. Hence making a quantitative, standardized approach to the phenomenon is a difficult enterprise. Grossman (2019) additionally recently showed the substantial degree to which quantitative investigations of mindfulness are fundamentally affected by the subjective influences and biases they are assumed to mitigate. As a consequence, proposals have been made to intensify the qualitative inquiry of MBIs (Garland and Gaylord 2009; Grossman 2008 & 2019).

In terms of the number and diversity of qualitative studies published, it seems that this suggestion has been taken increasingly seriously. Searching for “mindfulness AND qualitative”, the SCOPUS data base alone shows an increase of annual publications from 14 in 2008 to 133 in 2018. Applying different qualitative methods such as Grounded Theory (GT), Content Analysis (CA) or Interpretative-Phenomenological Analysis (IPA), researchers have aimed to deepen the understanding of MBIs’ impacts and mechanisms in a broad range of fields including psychotherapeutic settings (Williams et al. 2011), prisons (Himmelstein et al. 2012), breast cancer treatments (Schellekens et al. 2016), education (Bannirchelvam et al. 2017), the workplace (Hugh-Jones et al. 2017), or childbirth (Malis et al. 2017). Similar to meta-analyses in the field of quantitative research, first studies are now also available for qualitative mindfulness research, which attempt to synthesize the results of various studies (e.g. by using meta-ethnography, Malpass et al. 2011).

Alongside the growing interest to study MBIs from a qualitative angle, the question emerges whether a qualitative approach is, per se, sufficient to overcome the methodological difficulties related to the inquiry of the phenomenon. There are at least three reasons for doubt: Firstly, while it appears obvious that qualitative approaches are suited better for reconstructing the individual experiences of mindfulness practice than quantitative research, they are by no means immune to error and bias (Norris 1997). To the contrary, qualitative research is prone to biases at all stages of the research process, beginning with topic selection, to data collection and analysis, and to the final step of publishing (Mehra 2002; Petticrew et al. 2008; Silverman 2000). In particular, different methodologies come along with specific
distorting tendencies (e.g. Smith & Osborn 2008) and bring potential methodological perspective biases (Deady 2011), so that there is no good reason to assume that the qualitative investigation of MBIs can be exempt from these tendencies. The second reason is that research on mindfulness is particularly prone to such biases. As mentioned above, the demand for qualitative research on mindfulness is grounded in the intention to reconstruct the individual experience of the practice. Methodologies inspired by phenomenology like IPA seem to be perfectly suited for such an endeavor, as they explicitly aim at making sense of the subjectively lived experiences of research participants by interpreting their interpretations of them. However, Grossman (2008), for example, emphasized the importance of personal experience with mindfulness practices as a prerequisite for studying the phenomenon. Although Grossman referred to quantitative research, it appears no less likely that a lack of personal experience with mindfulness practices equally represents an obstacle in reconstructing the lived experience of mindfulness practitioners. At the same time, strong personal engagement in the practice or underlying research interests can also restrict researchers’ objectivity toward the phenomenon (Chavez 2008), and findings on positive publication bias within mindfulness literature (Nowogrodzki 2016) provide strong evidence that this is commonly the case. Thirdly, it must be highlighted that the application of a qualitative research method, albeit allowing for a more comprehensive look at the object under investigation than is generally possible from a quantitative angle, still represents a particular perspective on this object. Such perspective, usually gained from observing small samples, entails procedures, assumptions and theoretical lenses that make certain aspects visible while others remain opaque (Morse and Chung 2003). In sum, qualitative approaches toward mindfulness practices require a critical and differentiated discussion in the same way as is the case for quantitative studies (see Grossman 2019).

This background notwithstanding, methodological reflection remains scarce in current qualitative mindfulness research. In fact, some publications do not even locate themselves within a methodological perspective (see Malpass et al. 2011 for examples). And even though most studies do (sometimes only roughly) indicate their research methodology,
their explanation remains mostly limited to general characteristics of qualitative research. For example, they argue that it is well suited for studying new areas of inquiry (Allan et al. 2009, p. 414), can provide empirical insights in order to develop the theoretical understanding of the phenomenon (Allan et al. 2009, p. 414) and allows “to explore […] experience in as open-ended a manner as possible” (Christopher et al. 2011, p. 322). Similarly, explanations for selecting a specific method are barely provided along the actual topic of mindfulness, instead depicting for example IPA and GT as approaches “for [a] more open exploration of participants experience” and CA as a “more focused and theory driven approach” (Sweeney 2016). The application of GT is mostly justified by its theory-building potential (Kerr et al. 2011), while IPA is deemed to make visible “the construction and meaningfulness of experiences” (Williams et al. 2011, p. 382). Reflexive accounts analogously remain on a rather general level, problematizing the influence of subjective perspectives and presumptions (Haydicky et al. 2017) or the degree of engagement in the research procedure (Hugh-Jones et al. 2017) on data analysis. All these papers have in common that they lack an inquiry into what it precisely means to study mindfulness practices and their effects in a concrete field of application from a specific methodological point of view. To our knowledge, no such empirical investigation of qualitative methodological analyses has yet been undertaken - despite the above-mentioned insight into the need for stronger methodological reflections.

This article sets out to contribute to this agenda. It uses data material (in-depth interviews and practice diaries) from a study of a consumption-specific MBI (BiNKA-training) carried out between 2015 and 2018. The data was made subject to a cross-methodical analysis in order to systematically compare strengths and shortcomings of different methods when looking at the effects of mindfulness training.

In total, the comparative analysis involved four qualitative approaches: in addition to the common Qualitative Content Analysis (CA), Grounded Theory (GT) and Interpretative-Phenomenological Analysis (IPA), we also included a Discourse Analysis (DA), as this method carries a specifically relevant, yet so far almost entirely neglected, potential for
inquiring mindfulness practice. In what follows, we will illustrate how using a pluralistic qualitative method approach can cross-fertilize and overcome limitations of the application of single qualitative methods when studying mindfulness in general and the nexus between mindfulness and sustainable consumption in particular. We do that in the sense of a reflexive methodology (Alvesson and Sköldberg 2017), hoping to contribute to “a consideration of the perceptual, cognitive, theoretical, linguistic, (inter)textual, political and cultural circumstances that form the backdrop to – as well as impregnate – the interpretation” (p. 11) of mindfulness-related inquiry.

**Method**

**Participants**

The MBI was delivered to two target groups, namely university students and employees of three small and medium-sized enterprises that declared their participation in the research project beforehand (one engineering office, one market research institute, one university). In total, six training groups were implemented for each target group, resulting in a total number of 12 training groups with a maximum group size of 12 participants. The training was advertised to university students at the three universities in Berlin by means of a universities-wide website connected to sports program and health promotion offerings. Employees were informed via E-Mail of the possibility to attend the mindfulness training within their enterprise. In accordance with ethical guidelines of the German Psychology Association, participation was completely voluntary, reimbursement was in the form of a remitted course fee, and personal data of different measurement times was linked via an anonymous personal code, so inferences to individual persons were made impossible. Individuals were excluded from participation when they showed serious indications of psychological difficulties, based upon a brief individual screening performed by the mindfulness trainer.

Out of $n = 137$ participants, 25 were selected after the course-attendance for semi-structured interviews, and 24 were included in the analysis. (The interview guidelines can
be found at http://achtsamkeit-und-konsum.de/wp-content/uploads/2015/09/Interviewleitfaden_final.pdf.). While 13 participants of the sample were chosen randomly, the other 12 were selected on the basis of most extremes in values of pre-to post-intervention changes scores of the theoretically relevant quantitative scales (e.g. those who showed greatest vs. least improvement on scores putatively indexing facets of mindfulness, see below).

**Procedure**

Between 2015 and 2018, we carried out an intervention study called BiNKA (German acronym for “education for sustainable consumption through mindfulness training. For more information about the research project, see http://mindfulness-and-consumption.de/). The main assumption of the research project was that mindfulness training might be a promising way for fostering more sustainable consumption behavior. This assumption was supported by evidence from a systematic literature review of existing empirical, but almost exclusively, correlational, cross-sectional, studies on the nexus of mindfulness and sustainable consumption (Fischer et al. 2017). In detail, the review outlines four mechanisms according to which practicing mindfulness may possibly positively affect individuals’ way of consuming, namely through 1) enhancing concordance between attitudes and behaviors, 2) increasing well-being related to decreasing the extent of materialistic orientation, 3) fostering compassion and pro-social behavior and 4) disrupting unsustainable habitual behavior. However, the stocktaking also revealed that empirical investigations of causal links between MBIs and consumer behavior remain practically non-existent (Fischer et al. 2017).

Given the environmental urge to transform individual consumer practices and mindfulness’ potential to contribute to this aim, the research and development of the BiNKA project set out empirically to explore whether mindfulness training can, in fact, increase sustainable consumption in individuals. The main objective of the project was to provide a comprehensive empirical investigation of the relationship between mindfulness and sustainable consumption behavior, specifically whether consumption behaviors might be
influenced by means of mindfulness training. For that purpose, a consumption-specific MBI was developed (BiNKA training), and a portion of curriculum of the well-established MBSR (mindfulness-based stress reduction) program developed by Jon Kabat-Zinn (1991) was used and modified as a basis for the training. The MBSR program comprises eight weekly group sessions, one additional half-day session after week six ("day of mindfulness") and, importantly, daily individual practice. This program consists of a variety of elements, among them formal meditation practice, group discussions and reflections, insight talks and bodily exercises, including mindful yoga. In addition to modified MBSR elements, the BiNKA training was supplemented with specific consumer education activities embedded in a framework of mindful awareness, focusing on nutrition and clothing as two key domains of sustainable consumption (Geiger et al. 2017; see Stanszus et al. 2017 for a detailed account of the training and its development, as well as Fritzsche et al. 2018 for a practical toolkit illustrating exemplary exercises).

Interviews with course participants were conducted in August and November 2016 by three senior researchers not involved in teaching the intervention, each lasting between 35 and 70 minutes. All interviews were audiotaped and transcribed verbatim. Before the start of each interview, participants were asked to consent to audiotaping the interview and were reminded of their voluntary attendance, as well as their right to refuse answers or stop the interview at any time. The interview guidelines consisted of two parts. The first part of the interview invited open-ended responses about participants’ general experiences in the MBI and their practices at home that they deemed important to elaborate upon ("What did you experience in the training and with your practice at home?"). They were encouraged by the interviewer by means of follow-up questions to deviate into whichever direction they considered important to describe. In the second part, more detailed questions guided the interview, such as questions reflecting a general description of their eating and shopping food routines and possible changes to those behaviors over the last weeks ("Would you please elaborate on your general behavior regarding nutrition?"; "Did you experience any changes in relation to your general behavior regarding nutrition in the past weeks?"), or their
understanding of consumption and sustainable consumption (“What exactly is consumption to you?”, “How would you describe sustainable consumption?”). Interviewees were further asked if and how they perceived themselves more mindful, and what exactly they understood by their experience of mindfulness (“In your opinion, did you develop more ’mindfulness’? How would you know that/ how do you experience that?”). At the conclusion, they were encouraged to ask any open questions and were also informed about the state of the study and the next steps of analysis. In addition to the interviews, course participants wrote diaries reporting and reflecting on their daily mindfulness practice experiences as well as their informal mindfulness practice “homework.” With the consent of participants, the dairies were collected and included into the analysis. All procedures performed in the study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.”

**Measures**

The BiNKA study was predicated upon a Mixed-Methods design. The quantitative part aimed at empirically testing the aforementioned mechanisms of mindfulness on participants’ consumer behavior. For this purpose, all participants were surveyed with a quantitative questionnaire shortly before (pre) and shortly after (post) the intervention, as well as six months after completion of the training (follow-up). The qualitative inquiry was integrated in the research project for four reasons: Firstly, quantitative measures of mindfulness and empirical mindfulness investigations have been recently criticized and seen as insufficient sources of knowledge (see introduction). Therefore, enriching the quantitative data with in-depth interviews and course attendants’ diaries could engender a broader picture of the training effects. Secondly, a qualitative approach might allow a detailed reconstruction of subjective experiences associated with participating in a specific consumer-focused mindfulness intervention, as well as provide insights into the relation between mindfulness and consumption that go beyond pre-determined hypotheses derived from the systematic literature review (Fischer et al. 2017). Thirdly, the relation between mindfulness and
(sustainable) consumption behavior has rarely been investigated in a longitudinal study of mindfulness training. An explorative approach toward this relation was hence also needed, given the pioneering character of the BiNKA study. Fourthly, we thought that a qualitative perspective could also provide a somewhat more critical glance at mindfulness training, a viewpoint that is often neglected given the current, perhaps some exaggerated, enthusiasm about the phenomenon (van Dam et al. 2018).

As mentioned above, the research team considered four well-established methods for doing justice to these intentions, namely CA, IPA, GT and discourse analysis (after Keller 2011). CA is a systematic, rule guided qualitative text analysis, which is oriented towards the methodological quality criteria of the quantitative research paradigm, but at the same time integrates the openness of qualitative research methods (Mayring 2000). CA has a number of advantages that suggest it as the most appropriate method for triangulating qualitative and quantitative findings. The primary advantage of CA appeared to be that it allows to identify course effects and to translate the already existing hypotheses on the mindfulness-consumption nexus and use them in the analytical process (e.g. Mayring et al. 2007). However, its descriptive nature would necessarily restrict both the scope for interpreting the subjective experiences of training attendees, as well as the discovery of previously unconsidered relations between the mindfulness training and individuals’ consumer behavior. IPA is a qualitative method specifically tailored to make sense of peoples’ lived subjective experience (e.g. mindfulness practice) and the way they personally attribute meaning to this experience (Smith and Osborn 2008). A potential drawback of IPA is that it might impede the identification of cognitive biases and socio-structural patterns expressed by individuals when talking about their consumer behavior (Frank 2017; Herbrik and Kanter 2016). GT is a method aiming at generating new hypotheses about a given phenomenon based on a systematic gathering and analysis of data (Strauss and Corbin 1997). GT was thought to allow us to combine the reconstruction of subjective experience and the discovery of supra-individual patterns concerning the mindfulness-consumption nexus, yet the intention to link it to existing hypotheses or quantitative findings on course effects might restrict or even bias
its research outcome. DA, finally, appeared to be promising for the critical perspective on our MBI. DAs construe language as social interaction and are concerned with the social contexts in which discourse is embedded. Therefore, instead of interpreting participants’ reports on their mindfulness experience as testimonies of the reconstruction of their personal reality, DA could shed light on the larger cultural framework shaping course attendees prior knowledge about and expectations toward mindfulness practice.

In sum, choosing a single qualitative research methodology without *a priori* curtailing the research objectives turned out to be challenging. Given that systematic reflections on the potentials and limitations of different qualitative methodologies on MBIs, in general, and its relation to consumer behavior, in particular, were absent, the research team could not rely on previous empirical experiences on the matter. Inspired by similar works from marketing (Goulding 2005) and sustainability research (Nightingale 2016), it was therefore decided to transform the search for an appropriate qualitative method into a research question on its own. A pluralistic qualitative research (Frost 2011) was chosen for the qualitative research study that allowed to compare the application of different qualitative methodologies when investigating the nexus between mindfulness training and consumer behavior and provide an empirical answer to the question of what qualities of mindfulness qualitative studies elucidate, as well as how these qualities of mindfulness may relate to aspects of sustainable consumption.

**Data analyses**

The different methods were each applied to the raw data. CA, GT and IPA were mainly conducted by the qualitative core research team, consisting of two senior research fellows with multiple years of experience in applying CA and GT and also some experience with IPA. Their provisional results were regularly made subject to larger interpretation meetings that included other members of the research team. Also, upon numerous occasions external researchers specialized in qualitative methods participated. During these meetings, the two senior research fellows presented their analytical approaches based on the data.
material. In case of mutual agreement, these approaches were further pursued, and otherwise either revised or rejected. In addition, Pascal Frank and Daniel Fischer ran a research laboratory at Leuphana University in which undergraduate students applied CA and IPA on BiNKA interviews in order to obtain a more independent perspective on the matter. The students’ analyses provided an additional comparative framework in order to further validate our findings. DA was applied as an undergraduate thesis project supervised by the qualitative research team.

Data analysis started in January 2017 with the development of the coding scheme for CA. While the student assistants completed the coding process, the senior researchers sequentially undertook the first two steps of GT and IPA, regularly complemented by the aforementioned interpretation meetings. We completed CA in September 2018, before coming back to the last step of GT and IPA (again undertaken in sequential order). While we intended to apply each method as ‘purely’ as possible, we could not rule out cross-methodical influences.

**Content analysis**

For the qualitative content analysis, we followed the procedure suggested by Kuckartz (2014). We used semi-open coding to guide the analysis of the material through the theoretical considerations of the overall project on the one hand, and to maintain openness to phenomena occurring in the material, on the other hand. A deductive coding scheme was developed to reconstruct the subjective experience of participating in the MBI. The quantitative hypotheses, as well as the interview guideline and the respective theoretical foundations, were used as a grid for developing a first version of the deductive code system, which was tested against the material. In addition, inductive categories were developed alongside the coding process in order to account for the likely appearance of unanticipated effects. Subcategories were subsequently elaborated within an iterative coding and refining process until 25% of the data was unambiguously and completely categorized in accordance with the scheme. Two student assistants coded the remaining data material. Rooted in the codings, two senior researchers wrote individual case summaries, synthesizing and
abstracting the central effects of the intervention and its influence on participants’ consumer behaviors.

Grounded theory

We adapted Strauss and Corin’s (1997) understanding of GT to our study’s context. The previously mentioned logistical and broader methodological considerations did not allow for the iterative loop between data collection and analysis otherwise typical for GT research. However, the quantitatively grounded extreme-case selection aimed at a diversification of interviewees in terms of course effects. As suggested by Strauss and Corbin, data analysis was undertaken in an iterative three-step coding process. Firstly, each interview and the related diary were subject to an open-coding process, and categories, sub-categories, as well as early overall hypotheses, were formulated. Secondly, the axial-coding step was undertaken by comparing and applying generated categories and hypotheses to other interviews. In this step, special attention was given to the systematic search for opposing categories and contrary evidence (’flip-flop technique‘, Corbin and Strauss 2008) within data material. Provisional results of these processes were regularly discussed within the research team in order to include a variety of theoretical perspectives and avoid hasty conclusions, as recommended by Strauss and Corbin (1997). Thirdly, during selective coding, most relevant codes were identified and synthesized into main themes, eventually leading to an overall theory answering the BiNKA project’s key research questions.

Interpretative phenomenological analysis

The IPA was guided by two main interests, namely to find out (1) how participants experienced the BiNKA training and (2) how (if at all) they experienced the relationship between the training and their consumption practices. We applied the IPA procedure as suggested by Pietkiewicz and Smith (2012), consisting of three steps: Firstly, two independent researchers read (and listened to) the interview material several times and took notes about emerging observations and reflections on the data. Secondly, recurring notes were transformed into themes, related to the research questions. Thirdly, the senior
researchers identified relationships between the different themes and then exchanged upon their findings. They developed clusters based on clearly identified and agreed upon themes in order to work out overarching patterns within the data.

**Discourse analysis**

DA was conducted after the Sociology of Knowledge Approach to Discourse (SKAD) (Keller 2018). By means of this research perspective, we aimed at investigating prevailing social perceptions and interpretation patterns in participants’ discourse around mindfulness, and whether these patterns effected the course experience as well as the experienced relation to the participants’ consumer behaviour. As the SKAD analysis does not provide a cut-and-dry method, but we adapted the approach to the material as follows: Firstly, we identified those text passages in the interview material in which the respondents explicitly spoke about their understanding of mindfulness and reported on their consumer behaviour. This provided the base to identify patterns of interpretation, perceptions and collective social knowledge within the scope of mindfulness and sustainable consumption. Secondly, five interviews that represented the range of such patterns were selected for in-depth analysis. These were systematically compared to experts’ statements and opinions on the topic drawn from the literature in order to connect them to the prevailing ways people think of and speak about mindfulness and sustainable consumption. We then proceeded to examine the compiled ideas regarding mindfulness in the context of the intervention, to investigate if and how these ideas influenced the attendees’ experience in the training.

**Results**

**Content analysis**

Applying CA to the interview material, we were interested in the effects interviewees reported as a result of their participation in the consumption specific mindfulness training. In accord with the aforementioned procedure, we abstracted four main categories from the codings: (1) consumption behavior; (2) pre-behavioral dispositions of consumption behavior;
(3) mindfulness-related effects with the three subcategories (a) ethical qualities, (b) increased awareness, and (c) well-being; and (4) no and potentially aversive effects.

In the first effect category, a decrease in the interviewees’ impulses to consume was a main theme, e.g. for meat and sugar:

> It’s more of a mind thing, that I actually do like to eat meat, that I think it’s tasty, but I am often forbidding myself to eat it. Especially non-sustainably sourced meat. And in the [pizza with meat] situation [during the training], I realized, I don’t WANT that. I had this feeling of disgust. IGSTUX

This often went alongside an increase in perceived self-efficacy and, in one case, the development of sustainable consumption behavior in a previously unreflected area, namely organic food consumption. The latter respondent could, however, not trace the development back to a specific practice, but spoke about the positive influence of the whole of the training:

> I didn’t think much of organic products beforehand [...] I am a vegan, but hmm, I thought it was a rip-off, because it is always much more expensive and basically, it’s the same ingredients etc." "But, hmm, lately, I have been thinking, ok, I will spend the 30 cents extra and buy the organic product instead. KG3STU3

In total, four out of 25 interviewees mentioned such behavioral changes as a consequence of the training.

In the second category, pre-behavioral dispositions like awareness, attitudes or intentions are considered a prerequisite for changes of habitually unsustainable consumption patterns (e.g. Klöckner and Matthies 2004). Eight of the 25 interviewees reported effects on these pre-behavioral dispositions due to course participation. More precisely, they mentioned an increased importance of one’s own social and ecological values, a strengthened intention to put those values into action as well as an increase in appreciation and gratefulness for consumption goods.
With mindful eating, I experience the taste of every single bite with more awareness and greater appreciation, because I reflect on the origin of the products. When I then shop mindfully, I pay more heed to sustainable, organic, fair trade products. IG1STU10

The third category, mindfulness-related effects, entails all effects that occurred in response to the development of mindfulness, some of which are potentially beneficial for the development of sustainable consumption. They do not, however, show an explicit relation to (changes in) sustainable consumption. From 25 participants, 23 reported changes in three main themes. Firstly, an increased well-being through a better capability of dealing with stress and negative emotions and a more relaxed handling of difficult situations were elaborated upon:

I had the feeling that [through the practice] a lot of things did not bother me as much anymore, I could stay connected with myself and better observe what is REALLY happening. IG1STU2

The second theme describes the more general development of awareness for inner thoughts and processes. Many of those realized patterns had a direct link to consumption (especially food) or were related to reoccurring behavior such as habitual reactions to stressful encounters at work or dealing with emotional turmoil. Decreased reactivity, e.g. to upcoming negative emotions, was also reported as a likely consequence of increased awareness:

To pay more attention to myself. To consider my behavior more. This conscious dealing with emotions. In situations with both positive and negative emotions. I find a little more joy in the positive moments and can handle the negative ones better. IG2AN11

The development of so-called ‘ethical virtues’ (e.g. Grossman 2014) or ethical qualities, was the third theme in this category of codings, elaborated upon by half of the interviewees. Descriptions included the evolution of equanimity in relation to oneself and others, increase in empathy, a feeling of enhanced connection to nature and fellow human beings, and increases in compassion to others and oneself:
I am usually compassionate with my fellow humans (e.g. leaving my place in the bus for elderly people and helping them on the street), but mindfulness makes those processes conscious for me and strengthens the feeling of goodwill towards strangers. IG1STU10.

Two of the 25 participants reported to have experienced no effects from the training at all. Furthermore, a few interviewees spoke about a decrease in bad conscience when consuming unsustainably, which might result in more unsustainable consumption decisions and create adverse effects. Two course attendees also reported a higher focus on individual needs, which might also result, for example, in increased consumption or switching to less sustainable choices, e.g. taking the car instead of the train, or buying less organic food:

In that way, the training has […] opened my eyes […], as it helped me, to accept more and to say to myself: Ok. It is like that, because, maybe there is not enough money right now, to buy organic food. IG1STU2

To summarize: Despite few effects on the actual consumption behavior, the content analysis was able to shed light on the manifold perceived influences of the training on pre-behavioral dispositions like awareness, attitudes and intentions. Furthermore, strong effects of increased awareness about habitual behavioural and emotional patterns and development of ethical qualities were found, relevant pre-conditions for being able to change behavior consciously and consistently. The analysis also showed the strong variety of strength of effects in participants, yet without offering substantial answers as to why the effects were so different. It became clear, that more detailed and elaborate qualitative methods would be needed to provide these answers.

**Grounded theory**

The application of GT allowed inquiry more generally into what happened throughout the BiNKA training. This inquiry included but was not limited to experienced course effects. The first coding cycle led to 76 codes. These were clustered into five overall descriptive categories: (i) course effects, (ii) factors determining/influencing course effects, (iii)
experiencing the relation between mindfulness and consumption, (iv) relating to the practice and (v) talking about one’s consumer behavior. Each category comprised a series of sub-categories. For example: ‘course effects’ summarized the sub-categories ‘positive’, standing for actually reported effects that were clearly explained by course participation, ‘negative’ representing effects hypothesized in the literature that we could actually not find and (c) potentially adverse effects regarding the promotion of sustainable consumption. Positive effects were further differentiated according to general or consumption-related effects.

When comparing the different codes within the categories, it quickly became apparent that the way participants perceived the BiNKA training as well as its effects on their consumer behavior varied strongly from one attendee to another. While some participants clearly saw a relation between the training and consumption and stated either changes of their actual consumer behavior or preliminary stages of the latter (awareness, attitudes, intention), others could not make such a connection and did not report any effects regarding their individual consumption. On the one hand, almost all participants report that the training led to an increased awareness of their inner states and processes (e.g. emotions, thoughts, needs) and an increased attention toward the social and natural environment. Moreover, the majority of course attendees mentioned positive effects on their well-being, often related to improved coping mechanisms with stress and the cultivation of ethical qualities, such as compassion, patience, openness or equanimity. On the other hand, reported positive effects were often observed in singular situations or transiently occurred only directly after the training; hence they did not necessarily show lasting changes. In addition, we also found some course effects that could be considered as detrimental to promoting sustainable consumption. For example, some participants reported feeling more relaxed and less negative about consuming in opposition to their values, thereby reducing the affective motivation to consume in a sustainable way.

Overall, these findings led to the hypothesis that the effects of a consumer-focused mindfulness training are strongly influenced by factors independent of the actual practice. Within the data material, we could detect many of these factors, including the relation with
the teacher and the group, previous experience with the practice, the time and duration of the training (i.e. ‘exposure’ to the intervention) and general living conditions of the participants. Variations in subjective theories (Groeben et al. 1988) of themselves, meditation practice, consumption and sustainability turned out to be of particular relevance for understanding course effects and judgment of the training. For example, some participants believed the practice of meditation should switch off thinking and lead to a feeling of relaxation. However, when they realized in practice that they were still thinking and becoming agitated, this led to disappointment and the impression that they did not have the ability to meditate:

I had the feeling that it didn’t work properly. I mean that my mind immediately started wandering. Sometimes I had the feeling that my mind jumped from one topic to another every few seconds […]. I thought that it should or must work in a certain manner and observed that it didn’t work this way for me. IG1STU10

Similar effects were observed with regard to the participants’ consumer behavior. Participants who considered their consumer behavior to be morally problematic, but thought to have ignored its impacts, tended to report increased negative emotions due to the expanded consciousness about their attitude-behavior gap:

Interviewer (Int): Did you recognize any changes with regard to your eating habits or your purchasing behavior with regard to clothes during the last weeks? Participant (P): Yes, I think so. Especially regarding clothes I started to reflect more. And I recognize that I have a guilty conscience more often. IG2AN12

In contrast, people stating that one should not feel bad when occasionally consuming against their attitudes yet had experienced feelings of guilt experienced reduced negative emotions due to course participation:

The course participation probably gave me more serenity in this matter. Because I do tend to have a guilty conscience when I’m aware that I can’t act in accordance with my own moral standards. In this regard […], the course helped me to accept that. IG1STU2
In sum, GT analysis corroborated the findings of CA that the BiNKA training increased awareness of inner states and processes (e.g. emotions, thoughts, needs) and led to an increased attention toward the social and natural environment. However, how people interpreted and made use of this awareness varied significantly and seemed to be influenced by a multitude of factors. In many cases, they stayed in line with and stabilized preexisting subjective theories, leaving the impression that the BiNKA participants tended to interpret the course experience in a way such that it confirmed the expectations they held of it in the first place.

**Interpretative phenomenological analysis**

IPA was applied to find out how participants experienced the BiNKA training and how they interpreted this experience. Given the training’s focus on consumption, a special interest was to find out whether participants would relate their training experiences to their consumer behavior.

In terms of general course experience, we clustered the attendees’ reports into three categories, namely (a) the immediate experience of the practice, (b) the perceived effects of the BiNKA training, and (c) the perception of factors that influenced the course experience. Overall, most participants described the course attendance as positive, using adjectives as pleasant, relaxing or centering to summarize their experience. They said that the practice helped them in decreasing rumination and becoming more in touch with the current moment by focusing on their breath or bodily sensations, which was perceived as resulting in a more attentive, conscious state of mind. However, the various elements of the training were experienced very differently by different participants. While some felt at ease with the body-scan practice and breath awareness, others stated that they quickly fell asleep when scanning their body or that observation of the breath induced a sense of nervousness.

I felt more comfortable with certain practices than with others. For example, I could much better relate to the breath observation than to the other methods. IG2AN9
Similarly, another practice, Metta meditation (a practice aimed at invoking thoughts and feelings of kindness) was conceived as particularly valuable by some, while others had less positive experiences with it, felt rather overwhelmed or could not relate to the technique at all:

I tried to look at a current conflict of mine. I tried to imagine that person with whom I’m currently having difficulties and then expand my compassion to her. I think I was probably overburdened with that, because it simply didn’t work. I couldn’t detach myself from my feelings. IG1STU10

Differences between course practice and homework practice were also highlighted by the participants: While practicing at home may allow individuals to adopt exercises to their own specific needs and pace, some participants voiced their struggle to integrate the practices into their daily life. In some occasions, this led to feelings of pressure or guilt when skipping practicing or an inner restlessness when it was, indeed, done, more like a chore than a support:

Then it was always like this: I still have to do that, to check it off somehow. In these cases […], it felt more like a task I had to do and less like something that was good for me. Something I wanted to do for myself. IG3STU4

The analysis also revealed a variety of factors influencing the course experience that were not directly related to the actual practice, such as the effects of the group constellation or the time of the training. For example, some attendees reported discomfort in doing the training with colleagues, which hindered the sharing and deepening of their personal experiences.

I sometimes found the questions and techniques problematic in this group constellation. I experienced them as somewhat invasive. IG2AN9

For others, the group turned out to be key for their positive course experience. Those participants felt a strong support by the group, because exchanges with other participants made them realize “they were not alone” with their personal difficulties.
In terms of reported effects, IPA initially revealed an increased awareness of inner states and processes, as well as an increased attention toward the social and natural environment. The majority of course participants stated positive effects on their well-being, often related to improved coping mechanisms with stress and the cultivation of ethical qualities. Nevertheless, they usually described their increased awareness or positive effects on well-being as “subtle”, “not life-changing”, even though one interviewee left the course with a “whole new perspective on life” (IG3AN8). In sum, the IPA showed that the BiNKA training was experienced very differently from one participant to another, albeit there was a clear tendency toward small positive immediate and lasting effects on awareness, well-being and ethical virtues, such as compassion or a feeling of connection to nature and fellow human beings.

Concerning the experience of the relation between mindfulness and consumption, the majority of course participants were theoretically able to construe a relation between mindfulness and sustainable consumption as hypothesized be a consequence of the BiNKA course (see Stanszus et al. 2017):

I liked the pedagogical approach behind the course. The idea that people develop the insights by themselves, through mindfulness and observation and not through instruction. IG2AN12

However, only in a few cases, participants reported actual effects on their consumer behavior. Some mentioned affective changes related to their consumption (e.g. less appetite for meat) and stated that their increased awareness for inner processes helped them better to connect to their actual needs, resulting in the avoidance of consumer goods they considered problematic (e.g. sugar, meat). In opposition to the BiNKA training’s core intention to foster more sustainable consumption choices through stimulating affective-motivational competencies among course attendees, about one third of the participants pointed out the role of the more discursive-intellectual consumer education activities and the group exchange as the important links between the training and consumption:
Int: Do you think that such a consumer-focused mindfulness training can be useful in order to develop a more sustainable consumer behavior? P: Yes, I would think so. Especially when you are together with people that have thought about these topics beforehand […]. Some people might not have reflected upon these topics in advance, but others have done so for a long time already. And then there is an exchange. Int: So you think it’s the group exchange? P: Yes, I think it’s the group exchange. IG3AN8

Some did not see any relation at all, reasoning, for example, that mindfulness training was rather “self-centered”, that is, an internal affair, whereas consumption and sustainability constituted “external issues”.

**Discourse analysis**

Even if mindfulness is characterized as an open-minded state of pure observation (e.g. Bodhi 2013; Kerr et al. 2011), participants’ experiences in an MBI are always framed in a specific sociocultural context. Not only can the personal course experience be influenced by external factors like time (e.g. the season or time of day) or the particular setting in which it occurs, but as the larger cultural framework will shape the participants prior knowledge about and expectations toward mindfulness practice. Discourse analysis intends to understand individuals’ life experiences and the way they generate meaning from the latter against the backdrop of this cultural framework. For this study, we aimed to reconstruct relevant patterns of speaking about and making sense of mindfulness training. In this respect, we investigated whether - and if so in which way - subjective ideas of mindfulness influenced the experience of the BiNKA training. Furthermore, we also analysed the way people talked about their consumer behaviour and investigated whether the attendees’ discourse on consumption somehow differed from prevailing patterns identified in the literature on the topic.

Regarding the first line of inquiry – participants’ perception of mindfulness – we found three striking interpretation schemes: The first result was the instrumental perspective on the practice. Many participants attended the course with the intention of benefiting from mindfulness on a personal level, in terms of reducing stress or gaining greater awareness in
their daily life by means of the application of short mindfulness exercises. Several attendees, furthermore, stated that they expected to receive hands-on tools that could easily and time effectively be adopted to help them to become more efficient, e.g. in their work life. One participant (KG1AN1) described mindfulness as “another tool for his toolbox,” which allows him to get relaxed within a short amount of time and to be ready for action immediately afterwards. Examining this finding in relation to the existing mindfulness literature, it appears that it reflects a general trend, as discussed by experts like Hyland (2017). He claimed this understanding of mindfulness represents a misuse or even abuse of the concept of mindfulness based upon original Buddhist notions of the phenomenon, because it can easily result in a contradiction to the ethical foundation of the Buddhist traditions that include kindness, compassion, detachment of material goods and solidarity (see Grossman 2014). Mindfulness in the described context of instrumentalization is expected to offer specific help and to contribute to the solution of personal problems in an instrumental and technical way. This perception contrasts with the intervention logic of the conducted MBI as self-exploration and a time-consuming, gradual path in which altered perspectives and understandings of self, experience and the world may evolve. An example of the differences between participants’ expectations and the actual underlying aims of intervention of the course could be seen by the fact that many attendees reported they did not perform or continue to practice the course exercises, or they disliked them because the expected results did not occur.

Secondly, it became apparent that many participants did not include the practice of meditation in their idea of mindfulness but, in fact, completely separated the two terms from each other. This was expressed by reports that many participants liked the idea of mindfulness but did not feel comfortable about practising meditation. For one attendee mindfulness “is talking about certain topics and raising awareness regarding those topics […] but that has, in my opinion, nothing to do with meditation”. IG1AN12.

This separation seems to be a general trend in the Western understanding of mindfulness. As Valerio (2016) demonstrated, mindfulness-related publications are often
concerned with the concept of mindfulness without considering any form of meditation practice. This way of understanding represents a change in the perception of what mindfulness is, in contrast to the Buddhist traditions where mindfulness is not seen as truly practiced or cultivated without some kind of meditation practice (Bodhi 2013, p.20), and meditation and mindfulness are, moreover, inextricably interwoven. Understanding meditation and mindfulness as being two separate and distinct practices affected the BiNKA course experience insofar as many participants often did not carry out the meditation exercises, arguing that they did not consider these practices necessary for developing their state of mindfulness.

The third finding was the distinction respondents made between mindfulness and science. Many attendees seemed to struggle with considering mindfulness within a scientific context, which could be seen in statements where mindfulness was described as something ‘non-scientific’. Furthermore, many respondents associated mindfulness with notions of “esoterism”, “spirituality” and “mysticism”, like in the following quote:

In fact, I’m really interested in the topic of mindfulness. But […] it always has a slightly esoteric character, which I really don't like. IG3AN10

This linkage presented a hindrance for some participants in their experience, as their expectations were not fulfilled by the course: They expected it, for example, to “deliver more actual ‘facts’” and did not consider mindfulness or meditation as an evidence-based practice (science, in contrast, was considered to epitomize evidence-based knowledge), which kept them from fully engaging in the practices.

Concerning the participants’ way to talk about their consumer behaviour, we found three similar discursive patterns to what current research on the topic suggests. Namely, they demonstrated a strong tendency to rationalize apparently unsustainable consumption (e.g. Frank 2017), e.g.:
I would like to consume more sustainably […] I would really prefer if people wouldn’t treat animals just as products to satisfy their needs […], but to afford sustainability one has to earn accordingly well. IG2AN9

Furthermore, they neutralize their own behaviours (Chatzidakis et al. 2007) and speak in hypothetical sentences when reflecting their intentions to consume more sustainably (Herbrik and Kanter 2016), e.g.:

Personally, I almost have to accept that I have to buy bad stuff [.]. Even if I spend more money the T-Shirts are produced in Bangladesh […], okay maybe I would have a choice […], but then the price is for me personally too high […]. Regarding my conscience, I would really love to buy a fair-trade T-Shirt, it’s not that I don’t care […] but it’s almost like as if you were forced to buy the bad stuff. IG1AN12

None of the attendees reported on insights into such psychological mechanisms (as Vago 2014 suggests) or gave evidence of increased self-determination (Levesque and Brown 2007) related to consumption. Discourse on personal consumption thus seemed unaffected by the BiNKA training.

To summarize, the DA of the interview data identified several ideas and perceptions that clearly reflect broader issues that figure centrally in both the academic and public debate and notions about mindfulness. This analysis indicated that many respondents were strongly influenced by such ideas and perceptions during their participation in the BiNKA program. This underlines the potency of contextual factors and discursive patterns that are likely to influence the experience and effects of an MBI. When examining the way people spoke about their consumer behaviour, the training did not seem to have much of an impact on the attendees.

Discussion

The aim of this study was to explore the results of different qualitative methods for analyzing interview data in mindfulness research. For this purpose, we investigated how
participants of a consumption-specific MBI related their experiences with mindfulness and meditation practice to the thematic context of sustainable consumption. This research interest was motivated by an observed certain lack of reflection within current qualitative research on mindfulness: different qualitative methods have been applied without considering their individual strengths, weaknesses and biases with regard to the research topic. Instead of contributing to overcome the various problems related to qualitative research, an undifferentiated application of qualitative research methodologies thus risks to engender further unclarities and potentially bias and obscure research findings. Analyzing interview data from a consumption-specific MBI (BiNKA training) with four methodical angles (Content Analysis, Grounded Theory, Interpretative-Phenomenological Analysis, Discourse Analysis), this study’s intention has been to contribute to closing this gap and laying the foundation for a reflexive methodology (Alvesson and Sköldberg 2017) of qualitative research on mindfulness.

Overall, we found that the application of these four methods did not reveal sharply distinct understandings of the participants’ mindfulness experience during this particular program or the experienced relation between mindfulness and consumption. Yet each method did elucidate unique aspects of the research object, not revealed by the other analytic approaches: CA constituted a relatively easily applicable method that provided a quick overview on the effectiveness of the BiNKA training. It demonstrated that the training had clear effects on perceived awareness, well-being and the development of ethical qualities on the side of the participants and also indicated the potential for influencing their pre-consuming stages (values, intentions, attitudes, consumption-related awareness). GT added insight into the complex set of conditions determining whether and how the mindfulness training influenced the attendees. IPA, in contrast, highlighted the subjectivity of the mindfulness experience and its link to consumption, suggesting that (1) different training elements had varying effects on participants, and (2) it was often not the meditation practice, as such, which linked the training to consumption, but rather the more general educational components embedded in the training curriculum. Finally, DA demonstrated that the short-
term mindfulness practice offered through the BiNKA training did not provide access to ‘pure’ or ‘unbiased’ experience, even though some scholarly definitions of mindfulness might suggest that can occur. Mindfulness experience in our program was rather shown to be influenced by the prevailing preconceptions and discourse on the topic (and this may have seeped in via outside influence or even via the views and biases of the MBI instructors themselves, since they are also susceptible to current sociocultural and other influences). In particular, course attendees sometimes showed typical strategies for rationalizing and legitimizing their personal consumer behaviors. In sum, each method offered distinct insights that would not have been accessible through the application of a single method. What the combination of the different methods, therefore, allowed was to take different perspectives on the research object that supplemented and enriched one another, thereby providing a more nuanced and holistic picture (Morse’s and Chung, 2003) of the participants’ mindfulness experiences and their relation to sustainable consumption behavior during the BiNKA training.

Furthermore, the pluralistic qualitative research turned out to be a promising way to inform single methodical approaches, hence helping to avoid hasty, one-sided and biased interpretations concerning our research topic. As Alvesson and Sköldberg (2017) put it, “the researcher can very often make the empirical material more or less fit into the preferred framework” (p. 370). Depending on a researcher’s personal relation to mindfulness practice, it is easy to find evidence for or against the effectiveness of such a training. Regarding the BiNKA project, some of the researchers were, in fact, actively engaged in regular mindfulness practice. An exclusive application of CA might have led to an overestimation of the positive effects of the training. On the other hand, an isolated application of DA could have prevented seeing the clear tendency of the intervention to have positive effects on awareness, well-being and ethical virtues of the training. This allowed for a more humble, critical and self-reflective interpretation of the data material. For example, the initial CA coding did not distinguish between singular and lasting effects of the training, thereby exaggerating the program’s actual effectiveness. IPA helped to clarify this issue by
elucidating this distinction in people’s reports of their course experience. This example illustrates how the in-depth analysis of the individual course experience through IPA helps to get a more detailed understanding of the effects of a mindfulness training and their conditionality. Such a detailed understanding is no default part of CA application. Another case is the way people spoke about their consumer behavior and the way it was affected by the BiNKA training. Attendees would often express perceived changes regarding their consumption without actually being able to precisely describe them. Applying CA, such statements were coded as reports on the course effectiveness. However, a discourse-analysis-inspired perspective can remind us that interviews constitute an opportunity for ‘moral storytelling’ (Silverman 2000) and allow interviewees to “frame their accounts in a politically conscious manner” (Alvesson and Sköldberg 2017, p. 365). Against this backdrop, we discarded any kind of speculative statement on consumption-related changes unless interviewees were able to illustrate them with concrete examples.

What makes this mutual information possible is the entanglement of distinct epistemological perspectives and paradigms coming along with the different methods. As Frost (2011) points out, “using different methods to analyze data means that different ways of looking at the data are being brought to the process” (p. 150). Obviously, none of these ways is better than another. They all make unique contributions to the understanding of the phenomenon under investigation, thereby developing a more holistic understanding of the latter. CA, as applied within the BiNKA study, provided a positivist point of view, looking at observable effects resulting from the training. While GT and IPA also included positivist elements, their underlying paradigm can was primarily constructivist-interpretive: Both looked at the way participants generated meaning from their course experience. While in the case of IPA, the inquiry sticks more strongly to what the interviewees report about their subjective experience, GT analysis is not interested in the subjective experience as such, but rather aims to disclose a larger social phenomenon behind these reports. In our study, this allowed to make visible the subjective differences in experiencing and hence benefiting from the various course elements through IPA, on the one hand, while on the other hand identifying
transsubjective factors influencing the course experience by applying GT. DA, finally, looked at the BINKA training from a rather critical and even deconstructive point of view, in the sense that it looked for evidence questioning the very essence of what some scholars claim mindfulness practice to be: a state of pure observation. Overall, combining such perspectives seems particularly relevant for mindfulness research, which is suffering from a positive publication bias (Nowogrodzki 2016) and a general tendency insufficiently to address and critically reflect methodological hindrances and epistemological assumptions (Van Dam et al. 2017). Enriching positivist paradigms with more differentiated constructivist-interpretive or even critical-deconstructivist perspectives might help to evaluate the effectiveness and appropriateness of mindfulness practices more accurately. Pluralistic analysis may also contribute to better understanding of what is often implicitly being conveyed by mindfulness instructors, as well as by program content, enabling us to refine teaching and practices. As this study shows, the type of qualitative analysis allows us to acknowledge mindfulness’s positive potential while also recognizing its limitations, hence contributing “to surmount the prior misunderstandings and past harms caused by pervasive Mindfulness Hype” (Van Dam et al. 2017, p. 22).

Of course, a pluralistic qualitative approach to mindfulness comes along with new challenges and shortcomings. Two of these became particularly relevant in our study. Firstly, there are practical limitations to the resources and capacities (also researchers’ skills) that research projects can dedicate to the qualitative investigation of MBIs. When choosing to analyze data material with different methodical lenses, the diversity of insights comes to some extent at the expense of greater depth of exploration. For example, we could only touch upon the observation that different training elements were perceived very differently from one participant to another, despite this fact’s relevance for the research project. The impression that many attendees in this particular mindfulness-based intervention highlighted the more traditional consumer education activities integrated into the training as useful in terms of their learning experiences and less often the meditation practice, as such, is a very relevant finding, given that the research project sought to investigate the potential
contributions of a mindfulness training to the field of education for sustainable consumption. Unfortunately, it was not possible to go back to the participants and investigate this aspect in further detail. Nevertheless, it is also clear that qualitative inquiries can never reach completion anyway, nor can related theories be finally proven or rejected on the basis of qualitative analysis (Alvesson and Sköldberg 2017). However, our arguments should not be mistaken as a naive request to multiply the numbers of methodical approaches in qualitative mindfulness research. It may not always necessary or fruitful to fully apply several methods within a research project. Following Alvesson Sköldberg’s (2017) suggestion, it is equally possible to analyze a selected part of the data material with a different method. Furthermore, we suggest complementing a methodical perspective with partial or full application of contrasting methods and to use such a multifaceted approach as a heuristic tool to inspire one’s research and theoretical considerations, as well as to raise awareness of personal assumptions and biases.

A second difficulty of a pluralistic qualitative research is that it might affect criteria such as reliability, generalizability and objectivity of the research (Frost 2011). The application of different approaches by the same researchers will inevitably influence the interpretations and might thus blur the individual findings of each method. In situations in which the proper application of a specific method stands as the focus of the research project, this can, in fact, be a problem. However, this shortcoming is compensated by the benefit to the research’s comprehensibility and self-reflexivity. As discussed above, the reciprocal influence of the methods constitutes a central epistemic strength, as it enriches each approach by making visible new aspects of the phenomenon that would have remained unseen from a single methodical angle. Moreover, (qualitative) research is always dependent on the researcher, his/her specific disciplinary background, methodical training as well has interests and paradigms he/she holds (e.g. Frost 2016). In our experience, it is a great strength of using more than one method to make these more visible and hence render the interpretative process more transparent.
Limitations and future research

Our approach itself has a number of limitations that in the spirit of a reflexive methodical account need to be made transparent. Four restrictions seem to be particularly relevant to us. The first major limitation was that the comparison of methods was limited to the data-analysis phase only. This limitation resulted primarily from the fact that our decision to investigate the specific contributions of various qualitative methods in the field of mindfulness research was only made during the course of the research study process, thus preventing preparatory work that would have been advantageous. In particular, the interview design was not specifically tailored to a combined qualitative analysis and remained stable throughout the data collection. This entails at least two consequences: For one, method-specific procedures in the collection of data, such as the iterative entanglement of data collection and data analysis as well as the adaptation of the interview guideline, as is for example applied in Grounded Theory, could not be undertaken. Therefore, the potential of the different methods could not be fully unleashed. For another, the interview guidelines had a focus on the effects experienced by the interviewees due to course participation and was hence more strongly oriented toward the content analysis. This orientation most probably influenced the statements of the interviewees and hence restricted the potential findings of each method from the outset. However, the extent of this influence has not been at the focus of this research and defines an important limitation in regard to its self-reflection. Expanding the comparison to the data collection would have allowed a more detailed understanding of how data collection effects the findings concerning MBI research. Further inquiry addressing the methodical sensitivity of (qualitative) mindfulness research is needed to shed light on this aspect.

A second limitation results from the fact that the application of the different methods in our investigation was partly carried out by the same persons. Efforts were made to achieve further external validation of the study results through interpretation meetings, the inclusion of student assistants in the coding process, an undergraduate research lab and out-sourcing DA to a Bachelor thesis. A more rigorously independent application of the methods for
further comparative studies would be desirable and of interest. It must be kept in mind, however, that (qualitative) research is always dependent on the researcher, his/her specific disciplinary background, methodical training and specific interests, paradigms and other skills that he/she possesses. Considering this limitation, a step further in the sense of self-reflexive methodology, it might be valuable systematically to analyze researcher sensitivity in regard to mindfulness research more generally in future research.

Third, some of the findings described above could only be too briefly touched upon, since the diversity of insights we obtained came at the expense of greater depth of exploration. Especially the role of subjective theories and the impression that the training confirmed these theories instead of making them conscious constitutes a particularly relevant line of inquiry for further research on mindfulness practice that has only be addressed briefly in this study.

Fourth and finally, it needs to be clarified that our findings concern a particular MBI, underpinned by a specific interpretation of what mindfulness is and how it may be facilitated and taught by specific people. Hence, there are good reasons to assume that other teachers and curricula might have elicited a very different pattern of response and experience. This raises two questions that remain unaddressed due to the confined scope of this study, namely (1) to what extent the findings discussed above can be generalized, and (2) which role the teachers delivering the BiNKA training played in bringing about these findings, in particular with regard to how their subjective theories on mindfulness (and consumption) may have affected the attendees’ course experience. Especially the latter question seems to be a very much neglected issue of mindfulness research, yet inquiring it could help understanding both program developers and teachers as to what they are actually doing and how this relates to the idea of mindfulness in general.

Despite the limitations mentioned above, we believe we have shown how pluralistic qualitative mindfulness research can be used to identify blind spots and limitations of a single method, generally increase the self-reflexiveness of one’s methodological approach and thus
help to arrive at a more differentiated and comprehensive understanding of mindfulness practice. It would be desirable to intensify the method-reflexive discussion here in a joint effort to conduct not only more, but better quality, qualitative mindfulness research and, in a further step, to extend it to the combination of different methods, for example in the field of mixed-methods studies and the combination of qualitative methods with neuroscience.
Bibliography


iv. Healthy eating and sustainable nutrition through mindfulness?
Mixed method results of a controlled intervention study


Abstract

Mindless eating is at the core of many ecological and social problems associated with modern nutritional behavior. Mindfulness training has been proven to be an efficient means for improving healthy nutrition. First, it enables reconnection with internal hunger and satiety cues, instead of external cues. Second, it supports making deliberate choices against unconscious eating patterns. It is less clear whether training in mindfulness can be similarly effective for sustainable nutritional habits, defined here as socially and ecologically responsible consumption behaviors over the whole consumption cycle. A controlled mixed method intervention study employed an adapted mindfulness-based intervention (MBI) to investigate such potential effects in a healthy, adult student population (n = 76 /n = 11). Results from both qualitative and quantitative data indicate that the MBI exerts strong effects on mindful eating, whereas effects on sustainable nutritional behaviors are limited and only appear in the qualitative data as content concerning pre-behavioral stages of consumption, such as attitudes and intentions. First follow-up results suggest a slower process for changing nutritional behaviors toward more sustainable food choices. Based on the integrated mixed method results, we conclude that MBIs are an effective way to change unhealthy, mindless eating habits. To obtain stronger effects on sustainable nutritional behaviors, we suggest MBIs with a specific focus on sustainable nutritional behaviors and openly advertising the aim of the intervention in order to create a common intention in target groups who are looking for ways to put their altruistic intentions into practice, e.g. in sustainable consumption education programs.
Keywords:
Mindful eating, healthy eating, sustainable consumption, mindfulness

Introduction

It is widely known that contemporary nutritional is related to multiple societal and environmental problems. These health problems of virtually epidemic proportion, such as obesity, are mainly found in the western hemisphere, and are rooted in the ongoing development of the global food system. The focus of production on processed, low-priced and highly marketed food (Swinburn et al., 2011) and changes in diet composition – for example, a shift towards higher intake of animal products – are key factors for associated problems (Tilman & Clark, 2014).

At the same time, modern developments in production and consumption of food have been singled out as a major cause of climate change (Steinfeld, 2006). According to leading international organizations and researchers, the food production sector causes, among other deterrents, more greenhouse gas emissions relevant to climate change than any other industry (ibid.). Apart from environmentally-friendly food production, public health and social justice are both essential parts of the United Nations’ Agenda for sustainable development (United Nations, 2017). Contemporary Western diets are a serious threat to this agenda, making the establishment of sustainable food production and consumption one of the main tasks for supporting sustainable development. Because the food industry is highly dependent on demand, consumers are especially responsible for contributing to the accomplishment of this task.

Many consumers in western countries seem to be inclined to eat more sustainably. For example, they express their intentions to consume less animal products and see this as one aspect of becoming healthier and protecting both the environment and animal welfare (Lee & Simpson, 2014; Radnitz, Beezhold, & DiMatteo, 2015). In Germany, for example, a willingness to reduce consumption of animal products is affirmed by two thirds of the population (Scholl, Gossen, Holzhauer, & Schipperges, 2016). Despite a recent slight
decrease in meat consumption in western countries, overall consumption remains much higher than what is ecologically sustainable (Lee & Simpson, 2014). Pre-behavioral stages of consumption such as attitudes and intentions, which are deemed important predictors of sustainable behavior (Bamberg & Moeser, 2007), thus do not seem to translate into immediate behavioral change. Apart from extensive research concerning the attitude-behavior-gap (Kleinhückelkotten, Neitzke & Moser, 2016), there are many other explanatory approaches to this phenomenon (Dewaele et. al, 2018). Frank (2017), for example, argues that people lack cognitive awareness about the realities of food production, consumption and the corresponding consequences for health, environment and animal welfare and that this lack of awareness is due to widespread dissociation between food production and consumption at both the societal and individual levels.

One approach that appears promising for tackling these challenges is the practice of mindfulness in the context of nutritional behavior. The general concept of mindfulness stems from Buddhist philosophy and psychology, where mindfulness is seen as an important means by which human tendencies toward greediness, aversion and delusional thinking can be counteracted, and ethical attitudes and behaviors cultivated that are oriented toward benevolent relations to the animate and inanimate world (Grossman, 2015). To cultivate mindfulness, a variety of practices can be used to systematically train awareness and emotional (non-) reactivity as well as enhance awareness of internal processes such as thoughts, emotions and bodily sensations (Chiesa & Malinowski, 2011). In particular, current research suggests that mindfulness practice can help individuals cultivate conscious and healthy eating behaviors (Beshara, Hutchinson, & Wilson, 2013; Kristeller, Wolever, & Sheets, 2014). Another strand of research suggests that mindfulness carries the potential to foster sustainable consumer behaviors (e.g. Rosenberg, 2004; Armstrong & Jackson, 2015; Ericson et al., 2014; Fischer et al, 2018). However, empirical studies about the practice’s potential to stimulate eating behaviors oriented toward the ecological and social dimension of sustainability remain absent.
This paper will contribute to closing this gap by investigating the effects of a consumption-specific mindfulness-based intervention (MBI) on mindful eating and sustainable nutritional behavior in a mixed method approach employing both qualitative and quantitative data. It is based on a larger research project called “BiNKA”\(^2\), where the focus was to pioneer explorations into the general effects of a consumption-specific MBI.

After outlining the study’s theoretical background, the research procedure is explained and findings are presented. The last part of the paper comprises a discussion of results, followed by a consideration of research limitations, and concluding remarks.

**Mindfulness and nutritional behavior**

Eating has been deemed an “overlearned behavior” (Mantzios & Wilson, 2015) that is carried out absent-mindedly, or “mindlessly” (Kristeller & Epel, 2014). Unconsciousness about our nutritional behavior extends from the origin of our daily meals, to “what” we eat, “\textit{how much}”, “\textit{how}”, and “\textit{why}” we eat. This entails varying degrees of automaticity alongside strongly habitualized consumption patterns (van't Riet et al., 2011). As a consequence, eating is often initiated according to external, instead of internal, cues (e.g. mealtimes or other social pressures, instead of physical hunger). In fact, food-related behaviors are always embedded in socio-cultural and structural contexts, reducing consumers’ reflexivity concerning personal intentions and attitudes, as well as their knowledge about the origins of food.

Furthermore, as Mantzios & Wilson (2015) point out, eating is often a reaction to impulses or it is an emotional coping strategy for avoiding or suppressing negative thoughts and emotions, instead of being primarily based on physical needs or rational argument. Thus, despite general willingness among consumers to eat in a healthy and more sustainable manner and an increasing awareness for this, strong habits and automaticity, impulsivity related to

\(^2\) The BiNKA-study, named after a German acronym for “Education for Sustainable Consumption through Mindfulness Training”, hereinafter referred to as MBI or intervention, as this paper focusses only on a specific part of the bigger study. For further details about the background and the project see Stanszus et al. (2017).
external triggers, and using food as a coping mechanism often restrict the control that people have over their food purchases and consumption (Bahl, Milne, Ross, & Chan, 2013).

More recently, scholars have suggested that the cultivation of mindful nutritional behavior could address these challenges (Bahl et al., 2013; Marchiori & Papies, 2014; Dutton, 2008). Using the definition of mindfulness “as the unbiased awareness that emerges through intentionally and continuously paying attention to subjective momentary experience with an open, accepting, benevolent, and compassionate attitude” (Boehme et al., 2016, p.6), mindful nutritional behavior can be understood as nutritional behavior accompanied by an unbiased awareness of physical and emotional sensations, feelings and thoughts. This behavior includes shopping for food, eating, being otherwise exposed to food, as well as discarding food. To count as being mindful, all these ways of relating to food must be grounded in an open, accepting, benevolent, and compassionate attitude (see also Framson et al., 2009).

In fact, the practice of mindfulness has been successfully applied to reconnect people with healthy, mindful eating behavior (Bahl et al., 2013; Marchiori & Papies, 2014; Dutton, 2008). It has been particularly successful in supporting therapies for eating disorders, mainly binge eating and obesity (Alberts, Mulkens, Smeets, & Thewissen, 2010; Bahl et al., 2013; Godfrey, Gallo, & Afari, 2015; Kristeller, Wolever, & Sheets, 2014; Miller, Kristeller, Headings, & Nagaraja, 2014; Warren, Smith, & Ashwell, 2017; Pinto-Gouveia et al. 2017). More specifically, it has been shown that combining mindfulness training with the intention to change eating behavior has an effect on the aforementioned psychological mechanisms of mindless eating. Reduced overall automaticity in eating and shopping for specific goods and increased non-reactivity to externally initialized cravings were shown by Jacobs et al. (2013), Mantzios & Wilson (2015) and most recently by Tapper et al. (2018). A rise in general awareness about eating behavior, reported in all studies, was often accompanied by increased responsiveness to internal, physical cues instead of impulsive or emotional triggers. The growth in awareness often extended to specifics such as how we eat (slow, fast, with distractions such as watching tv, reading, or day-dreaming) and what we eat, and resulted in
a documented weakening of habitual patterns (Warren et al., 2017; Miller et al., 2014; Kristeller et al., 2014). This development also supported more deliberate and healthier choices (Bahl et al., 2013; Warren et al., 2017; Kristeller & Lieberstein, 2016; Keesman, Aarts, Häfner, & Papies, 2018). Further detailing which aspect of mindfulness supports these effects, Keesman et al. (2017) describe the facet “decentering”. This facet of mindfulness describes the practice of distancing oneself from immediate sensations and focusing on the impermanence of one’s state of mind, e.g. thoughts and bodily stimulations or cravings. According to the authors, decentering targets the underlying process of automatic food cue reactions in the body, consequently enabling a more deliberate, de-automatized choice of what and when to eat.

These various effects are interrelated and interdependent. However, it should be apparent that this seeming increase in general awareness allows for changes in habitual response patterns rooted in emotions and impulses. The ability to take a decentered perspective allows one to respond to inner satiety cues and in consequence leads to more deliberate and healthy choices. The evidence presented here suggests that mindfulness training enables people to understand and de-automatize their previous seemingly remote-controlled behavior and to increase their general health and well-being.

**Mindfulness and sustainable consumption**

For similar reasons, multiple scholars have argued that mindfulness training may also have the potential to promote sustainable nutritional behavior. Such behavior is defined here according to the cube model of sustainable consumption behaviors (Geiger, Fischer, & Schrader, 2017) as individual acts for acquiring, using and disposing of food that do not compromise the ecological and socio-economic living conditions of any other people, currently living or in the future, in such a way that they can’t satisfy their needs. The literature suggests different mechanisms through which mindfulness can be cultivated, leading to increased sustainable consumption (for a more detailed discussion see Fischer et al., 2017; Geiger, Grossman, & Schrader, 2019):
1. **Disruption of routines**: as previously discussed regarding mindless eating, unconscious consumption routines can also entail unsustainable ones. By enhancing introspective capacities, mindfulness practice leads to an increased awareness of the inner states and processes that usually prompt habitual behaviors (Rosenberg, 2004; Bahl et al., 2016) and thus supports deliberate consumption choices. Concerning sustainable food consumption, Hunecke and Richter (2018) looked at the relationship between different facets of mindfulness and self-reported sustainable food consumption behavior. They found that one facet “acting with awareness”, had a direct, positive relationship with sustainable food consumption behavior, supporting the argument for the first potential mechanism.

2. **Physical and psychological well-being**: as mentioned above, there is ample evidence that mindfulness practice is instrumental for physical and psychological health and well-being (Eberth & Sedlmeier, 2012; Grossman et al., 2004). Psychological well-being has been discussed both as a consequence of and a precondition for sustainable behavior (Corral Verdugo, 2012; Kasser, 2017), and physical health behavior was shown to correlate positively with ecological conservation behavior (Geiger, Otto, Schrader, 2018).

3. **Values**: Mindfulness practice may be conducive to the clarification of values and to supporting the role of intrinsic and socially oriented values in people’s lives (Ericson et al., 2014, Kasser et al., 2014) and decreasing the importance of material values (Burroughs & Rindfleisch, 2002).

4. **Pro-sociality and compassion**: pro-social behaviors are explicitly increased through meditation practices (Lim, Condon, & DeSteno, 2015; Leiberg et al., 2011). This process is seen to be initiated through the development of compassion (Condon et al., 2013). Compassion and altruistic values in turn are positively linked to pro-environment intentions and behavior (deGroot & Steg, 2008; Geiger & Keller, 2017; Pfattheicher, Sassenrath, & Schindler, 2015).
5. Congruence: Self-perceived inattention to everyday experiences was found to be associated with a widening of the attitude-behavior gap (Chatzisarantis & Hagger, 2007; Ruffault, Bernier, Juge, & Fournier, 2016). As mindfulness implies the inverse of inattentiveness, i.e. enhanced awareness of immediate daily experiences, mindfulness may be associated with closure of the attitude-behavior gap. In the field of sustainable behaviors this would imply an enhancement of behaviors, as sustainability-related attitudes and intentions are usually rather high (Eurobarometer, 2014).

Expanding this topic specifically to nutritional behavior, Thích-Nhât-Hạnh & Cheung (2012) suggest that mindfulness practice could create a heightened awareness for the interconnectedness of individual food consumption with broader consumption and production spheres. Rosenberg (2004) defends this assertion, suggesting that mindfulness training re-instills a sense of interrelatedness between people, supporting non-consumerist satisfiers for people’s needs.

In conclusion, the aforementioned studies provide evidence for a relationship between mindful behavior and sustainable nutritional behaviors. However, individual mindful eating is not *per se* sustainable, as food production, use and disposal of foods might create social and environmental problems that undermine the agenda of sustainable development (Kjærgård, Land, & Bransholm Pedersen, 2014). In this sense, the positive *self-oriented* aspects of mindful eating need to be accompanied by altruistic, or “*other-oriented*” aspects (environment, society) in order to become a promising practice for fostering sustainable consumption. No empirical inquiry has so far undertaken to find out whether the development of *mindful eating patterns* comes along with *sustainable consumption behaviors* reflecting such an orientation towards others.

This paper will contribute to closing this gap by exploring the following research questions:
1. Does the adapted MBI have effects on mindful eating, confirming previous positive research findings?
2. Does the MBI have effects on pre-behavioral stages of consumption such as intentions and attitudes, as predictors for sustainable eating behavior?³
3. Does the MBI have effects on participants’ actual nutritional consumption behavior that is related to aspects of sustainability?

Methods & measures

Study Design

For this intervention study, a fully integrated mixed method model design was used (Foscht, Angerer, & Swoboda, 2007). The design accounts A) for the pioneering, explorative character of the research and the lack of precise data about which facets of mindfulness are trained through which practices, as well as B) for the difficulties that have been reported by many other studies to measure mindfulness with quantitative self-report measures alone (see Van Dam et al., 2018; Chiesa, 2013; Grossman, 2011) (See Figure 1).

³We included pre-behavioral phases of consumption, such as attitudes and intentions (Bamberg & Moeser, 2007), for two reasons: First, they are thought to be relevant predictors for explaining actual behavior, especially in the area of nutritional behavior (e.g. Berndsen & van der Pligt, 2004). Second, the integration of different stages of the consumption process allowed for an inquiry into the relation between mindfulness and sustainable nutritional behavior on a larger scale. This accounts for the novelty of the research area and its explorative character.
Mindfulness is a complex and multifaceted concept and, more importantly, a highly individual and subjective experience (Grossman, 2010). To be able to cover participants’ experiences and the potential effects of the MBIs as holistically as possible and thus to answer criticism regarding measuring effects of mindfulness with a too narrow methodological approach, a quantitative pre-/post-/follow-up study was combined with in-depth, semi-structured interviews (with a representative sub-sample of participants post-intervention) for a joint analysis (Kuckartz, 2016; Flick, 2014). Equal importance was ascribed to the two databases. The research design can be described as a fully integrated method model (Foscht et al., 2007), because it allowed the integration of hypothesis testing and hypothesis generation in a single study as well as parallel data collection with a theoretical sampling and an integrative analysis strategy. As presented in Figure 1, the design spanned all levels of the research process. Integrated research questions and, on the sample level, connecting quantitative and qualitative study through partly sub-sampling the interviewees according to quantitative results of the pre- and post-studies (sequential data collection) formed the basis of the design. On the data level, the qualitative interview guideline and the structuring of transcripts via the deductive codes were based on the quantitative hypotheses and the corresponding variables. However, inductive categories were generated as well. The results were compared and interpreted together to create sound and synthesized results.

Procedure

The MBI was advertised to university students in Berlin4 by means of an inter-university website connected to the sports program; announcements offered a stress-reduction program without disclosing the study’s focus on consumption (the program was also conceived to

---

4 The issue concerning the market coverage of sustainable food alternatives and their availability is deemed an important driver for broader adoption of sustainable nutritional behaviors (Di Gulio et al., 2014). Individuals’ food environment is highly relevant for food choices and can even influence social norms toward specific products (Frank, 2017). In this paper, however, the focus remains on individual behavior in the given context of the city of Berlin, Germany. Organic, vegetarian and even vegan food is abundant and available in all conventional supermarkets and a widespread network of organic supermarkets. The active and control groups (of the quantitative sample; there was no control group for the qualitative sample) were exposed to the same conditions for food choices, thus accounting for context effects.
enhance the well-being of attendees). In a pre-study meeting it was explained that students were expected to complete a series of questionnaires at different points in time in exchange for cost-free participation. Additionally, some students were asked to participate in a post-intervention interview. In accordance with ethical guidelines of the German Psychology Association, participation was completely voluntary, students were reimbursed in the form of a remitted course fee, and personal data at different measurement times were tracked via an anonymous personal code, so that individual persons could not be identified. Psychopathological conditions (e.g. clinical depression) were ruled out before the first session through a short screening executed by the mindfulness trainer. As no clinical population was involved and all participants were of legal age, a written statement was deemed unnecessary by the Ethical Committee of the Technische Universität Berlin.

Enrollees were randomly assigned to either the intervention group (IG), who received the mindfulness-based intervention (MBI) right away, or a wait-control group (CG) who received the MBI after the IG had finished. Three courses were run for each group, with group size varying between 12-13 participants, mirroring normal group sizes for MBSR-trainings.

Quantitative data on mindful and sustainable eating was gathered twice: within a week before the training started (pre) and within a week after the training was completed (post). In a follow-up measurement conducted seven months later, mindful eating was not assessed. Only the main variables of the general study on mindfulness and sustainable consumption were collected. Assessments were completed online. An invitation and two reminder emails were sent for each assessment.

The qualitative data was gathered through semi-structured interviews conducted post-intervention. Interviews were carried out by three main investigators from the project who were not involved in the teaching activities for the intervention. The interviews lasted between 35 and 70 minutes. All interviews were audiotaped and transcribed verbatim. Course participants also wrote diaries reporting their experiences of daily mindfulness practice. This
was additionally included in the analysis.

**Participants**

We aimed at recruiting a minimum of 72 (12 x 6) participants, to mirror usual group size for MBSR courses, while ensuring n > 30 in the intervention and control group for minimum statistical robustness and allowing for potential dropouts. Slightly overbooking each course, we initially recruited n = 79 students to participate in the study. n = 40 were assigned to the intervention group (IG) and n = 39 to the wait group (CG), with a random shuffle function applied to the running subject number.

Three students dropped out of the intervention group before the training started, leaving a starting student sample of n = 76 (n\textsubscript{IG} = 37/ n\textsubscript{CG} = 39) with a mean age of M=31 years, 73.4% were women. Nine women and two men (80% women, mean age M= 30 years) were selected for the semi-structured in-depth interviews. Five were selected on a random basis. The other 6 were selected because their quantitative results indicated extreme pre-post differences in either mindfulness or sustainable consumption measures. For various reasons some participants were unavailable. However, the final sample of interviewees represents a typical subsample of the entire cohort and is not a sample that tends toward the extreme ends of the quantitative data. The subsample thus does not differ from the whole sample in terms of age, gender, previous experience with mindfulness as well as results on mindfulness, mindful eating and sustainable consumption measures. Attendance of interviewees during the course was somewhat higher, as compared to the whole sample (see Table 1).

*Table 1: Demographic data of interview participants*

<table>
<thead>
<tr>
<th>No.</th>
<th>ID</th>
<th>Group</th>
<th>Frequency of participation</th>
<th>Age</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IG1STU10</td>
<td>IG</td>
<td>9</td>
<td>30</td>
<td>female</td>
</tr>
<tr>
<td>2</td>
<td>IG3STU12</td>
<td>IG</td>
<td>9</td>
<td>35</td>
<td>female</td>
</tr>
<tr>
<td>3</td>
<td>IG3STU4</td>
<td>IG</td>
<td>9</td>
<td>41</td>
<td>female</td>
</tr>
<tr>
<td>4</td>
<td>KG3STU9</td>
<td>CG</td>
<td>8</td>
<td>27</td>
<td>male</td>
</tr>
</tbody>
</table>
### Table

<table>
<thead>
<tr>
<th></th>
<th>IGSTUX*</th>
<th>IG</th>
<th>-</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>IG1STU2</td>
<td>IG</td>
<td>8</td>
<td>36</td>
<td>female</td>
</tr>
<tr>
<td>6</td>
<td>IG2STU8</td>
<td>IG</td>
<td>8</td>
<td>30</td>
<td>female</td>
</tr>
<tr>
<td>7</td>
<td>KG3STU2</td>
<td>CG</td>
<td>9</td>
<td>25</td>
<td>female</td>
</tr>
<tr>
<td>8</td>
<td>KG3STU3</td>
<td>CG</td>
<td>8</td>
<td>29</td>
<td>male</td>
</tr>
<tr>
<td>9</td>
<td>KG2STU17</td>
<td>CG</td>
<td>9</td>
<td>23</td>
<td>female</td>
</tr>
<tr>
<td>10</td>
<td>KG2STU9</td>
<td>CG</td>
<td>7</td>
<td>30</td>
<td>female</td>
</tr>
</tbody>
</table>

*Note: CG = (waiting list) control group. IG = Intervention group. 1-5 were chosen randomly *Values got lost.

### Intervention

The MBI included different exercises from sustainable consumption education programs put into the format of the well-established Mindfulness-based-stress-reduction (MBSR) program developed by Jon Kabat-Zinn (1991, c1990). Similar to the MBSR training, the consumption-specific MBI comprised eight weekly group sessions (of 90 minutes each), one additional half-day session after week six (“day of mindfulness”, four hours) and individual daily practice (20 minutes). The training included different meditation techniques (body scan, breathing meditation and loving-kindness or “metta” practice), as well as different educational formats such as group discussions, inquiry and guided reflections. Simple movement or yoga exercises were included, too. The first four weeks of the MBI were focused directly on cultivating mindfulness, on introducing the general concept of mindfulness, on obstacles and challenges in meditation and on the notions of dissatisfaction and emotional intelligence. Weeks five to eight subtly introduced the topic of consumption into the mindfulness framework and themes were addressed, such as needs and desires, compassion and kindness, mindful consumption and a world characterized by mindful awareness. The topic of nutrition was addressed with the standard MBSR raisin exercise (ibid.) daily homework (mindful intake of food and mindful grocery shopping as informal exercises) and mindful eating exercises in the course (eating in silence as a group exercise during the day of mindfulness). For further details on how the training was developed and
what it entails, see Stanszus et al., 2017.

Measures

Quantitative study

General Mindfulness

The Comprehensive Inventory of Mindful Experiences (CHIME) by Bergomi, Tschacher, and Kupper (2014) comprises 37 items to measure eight different facets: acceptance (e.g. “I see my mistakes and difficulties without judging myself”), acting consciously (e.g. “It is easy for me to stay focused on what I am doing”), inner awareness (e.g. “When I am sitting or lying, I perceive the sensations in my body”), outer awareness (e.g. “I perceive colors and shapes in nature clearly and consciously“), decentering (e.g. “In difficult situations, I can pause for a moment without reacting immediately”), openness (e.g. “I try to stay busy to keep specific thoughts or feelings from coming to my mind”), relativity (e.g. “In everyday life, I am aware that my view on things is subjective and does not necessarily correspond to facts“) and loving insight (e.g. “When I have needlessly given myself a hard time, I can see it with a bit of humor“). All items were assessed on a 7-point frequency scale where only the two extremes were labelled, with “almost never” (0) and “almost always” (6). Analyses were based on the overall scale mean (Cronbach’s $\alpha = .88$).

Mindful Eating

To assess mindful eating, a short version of the Mindful Eating Questionnaire by Framson et al. (2009) was constructed. Two items for each factor disinhibition (“I stop eating when I’m full, even when eating something I love”), awareness (“Before I eat I take a moment to appreciate the colors and smells of my food“), distraction (“My thoughts tend to wander while I am eating“) and emotional response (“When I’m sad I eat to feel better“) were retained. Only one item for external cues (“I recognize when food advertisements make me want to eat”) was retained because the second item showed negative loadings in a pre-test (“I recognize when I’m eating and not hungry.”). As for the CHIME scale, all items were
assessed on a 7-point frequency scale where only the two extremes were labelled, with “almost never” (0) and “almost always” (6), (Cronbach’s $\alpha = .62$). For a full list of items, see supplementary material A.

**Attitudes towards Sustainable Food Consumption**

An attitudinal scale was constructed following the recommendations for measurements of attitudes by Ajzen (1991). The 8-item scale on attitudes for sustainable consumption behavior (A-SCBNUTRITION: $\alpha = .65$) reflected the main aspects of the SCB-scale (e.g. “Fair prices for small scale farmers are important”). Items were assessed on a 7-point Likert scale with every second option labelled “completely disagree” (0), “rather disagree” (2), “rather agree” (4) and “completely agree” (6). For a full list of items, see supplementary material A.

**Sustainable Food Consumption**

Sustainable food consumption was measured with the Sustainable Consumption Behavior-Nutrition (SCBNUTRITION) scale by Geiger, Fischer et al. (2017). The 17-item scale ($\alpha = .73$) spans all three consumption phases and both dimensions of sustainability, ecological and socio-economic impacts (e.g. “I buy organically grown/fair trade products”, “I cook in an energy-saving way” or “I buy snacks and drinks in one-way packaging”- which was reverse coded). Items were assessed on a 7-point scale with every second option labelled with “never” (0), “sometimes” (2), “often” (4) and “always” (6). Answers for daily behaviors (e.g. preferred main courses) were labelled with “never” (0), “once a week” (3) and “daily” (6). For a full list of items, see supplementary material A.

**Qualitative study**

**Interviews**

Before the start of each interview, participants were asked for consent to audiotape the interview and were reminded of their voluntary attendance as well as their right to not answers or to stop the interview. After the official procedure, participants were invited to complete a one-minute breathing meditation to settle into the interviewing space and set the focus for the dialogue. To account for both the explorative character of the study and to gather
data on the specific research questions, the interview guideline was developed in two parts. The first part of the interview invited open-ended responses about participants’ general experiences in the MBI and practices at home that they deemed important to elaborate upon (“What did you experience in the training and with your practice at home?”). They were encouraged by the interviewer through follow-up questions to deviate toward whatever they considered important to describe. In the second part, questions with more detail guided the interview, such as questions for eliciting a general description of their eating and food shopping routines and possible changes to those behaviors over the last weeks (“Would you elaborate on your general nutrition behavior please?”, “Did you experience any changes in relation to your general nutrition behavior in the past weeks?”) or their understanding of consumption and sustainable consumption (“What exactly is consumption to you?”, “How would you describe sustainable consumption?”). Interviewees were further asked whether and how they perceived themselves to be more mindful, according to their understanding of the concept (“In your opinion, did you develop more “mindfulness?”, “How would you know that/ how do you experience that?”). In the end, they were encouraged to ask any open questions and were also informed about the state of the study and the next steps of analysis.

Data analysis

A qualitative content analysis (CA) based on Kuckartz (2014; 2016) provided the basis for data analysis. A deductive coding scheme was developed to reconstruct the subjective experience of participating in the MBI. As suggested by Kuckartz (ibid.) and Ramsentaler (2013), the quantitative hypotheses and the interview guideline were used as a grid for developing a first version of the deductive code system, which was tested against the material. Inductive categories were developed alongside the coding process, accounting for the likely appearance of unanticipated effects. Subcategories were subsequently elaborated within an iterative coding and refining process until 25% of the data was unambiguously and completely categorized in accordance with the scheme. Two student assistants coded the remaining data material. Based on the codings, the first and second author wrote individual
case summaries (Kuckartz, 2014), synthesizing and abstracting the central effects of the intervention and its influence on participants’ consumer behaviors.

**Results**

Results of the qualitative study will be directly compared and complemented with results from the quantitative survey, creating an integrated view on the effects of the consumption specific MBI.

*General mindfulness*

To establish the effectiveness of the MBI with regard to general mindfulness experienced by the participants as a prerequisite for further mindfulness-based effects, results on that measure will be presented first.

In the interviews, a perceived increase in general or specific areas of mindfulness was articulated by all participants. They usually associate mindfulness with higher attentiveness to ongoing experience, a more relaxed state of being and the development of ethical qualities, such as empathy, compassion and equanimity. Four statements help exemplify the effects:

“[…] I am in any case more mindful than before. Definitely.” IG2STU8

*INTERVIEWER:* “Ok, so you mean you became more mindful [through the MBI]? I: Definitely.” KG3STU3

„In a clearer awareness, different perception of people: - more empathic, more mindful.” KG2STU17 (Excerpt from training diary)

“I had the feeling that [through the practice] a lot of things did not bother me as much anymore, I could stay connected with myself and better observe what is REALLY happening.” IG1STU2

In the quantitative study, the changes in the CHIME measure over the course of the MBI were compared between the IG and CG. A 2x2 ANOVA with *experimental group* (IG-CG) and *measurement point in time* (pre-post) as factors revealed a significant interaction effect.
F (1,62) = 33.9, p = .001, η²p = .354), a significant main effect for measurement point in time F (1,62) = 26.8, p = .001, η²p = .302) and no main effect for experimental group F (1,62) < 1).

Post-hoc t-tests indicated substantial changes in the CHIME measure for the IG only (t (27) = 5.61, p < .001; dKORR = 1.32, see Figure 2, KG: t (35) = -0.73, p = .473).

Figure 2: Effects of the MBI on CHIME measure

![Graph showing effects of MBI on CHIME measure](image)

Table 2 gives a more detailed overview over the intervention’s effect on the different mindfulness facets. As can be seen, participants increased their mindful experiences significantly in all facets except the outer awareness facet, with strongest effects on acceptance and decentering. Acting consciously, capturing an antidote to automaticity, also increased in the intervention group. Weaker effects were observed in the three attitudinal facets of openness, relativity and insight.

Table 3: Effects of 2x2 ANOVA repeated measurements for all facets of mindfulness

<table>
<thead>
<tr>
<th>dV: mindful experiences and its facets:</th>
<th>Interaction effects:</th>
</tr>
</thead>
<tbody>
<tr>
<td>experimental condition x sample</td>
<td></td>
</tr>
<tr>
<td>CHIME</td>
<td></td>
</tr>
<tr>
<td>1. Acceptance</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>p</th>
<th>η²p</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIME</td>
<td>33.9</td>
<td>&lt;.001</td>
<td>.354</td>
</tr>
<tr>
<td>1. Acceptance</td>
<td>29.4</td>
<td>&lt;.001</td>
<td>.322</td>
</tr>
</tbody>
</table>
2. Decentering  21.4  <.001  .257
3. Acting consciously  15.9  <.001  .204
4. Inner awareness  10.5  =.002  .144
5. Outer awareness  3.3  = .075  .050
6. Openness  8.6  = .005  .122
7. Relativity  8.3  = .005  .118
8. Insight  8.3  =.006  .118

Mindful eating
Consistent with the results for general mindfulness, the analysis of the qualitative data also showed effects on mindful eating for all participants. The following section will describe the observed effects. Furthermore, selected quotations from participants will be presented to convey the essence of the theme, as well as to indicate how interwoven and interdependent the effects on the three aspects of mindless eating are.

A rise of general awareness and reflection concerning eating behavior was reported by interviewees. This resulted in a greater awareness of one’s level of physical hunger or satiety, alongside the capability to better respond to those internal cues, instead of e.g., habitually finishing one’s plate. The following quotes are examples:

"The slower and more aware I eat [compared to fast and timely restraint meals before the training], the better my stomach feels and the earlier and easier I notice when I am full." IG3STU4

"And through that practice [of mindful eating] I realized that I notice when I am full much faster. I found that quite astonishing and actually do pay more attention to that now in my day-to-day life. That doesn’t mean that I can always stop the eating impulse, but I do realize, puh, I am full. I had previously pushed that away or went straight over it." IG1STU2
Heightened and intensified pleasure while eating due to this rise in awareness or a more nuanced experience of different tastes was also a common development counteracting automaticity:

"It is fascinating what you can notice in the mouth if only you pay attention to it. The sweetness of grapes I perceived as much more extreme than I expected, to let a piece of banana melt on my tongue is an interesting experience, as is the neutralizing effect of coffee afterwards." IG3STU12

A recurring topic mentioned by participants concerned realizations about routinely and automatically eating while doing other things at the same time, such as watching TV, checking social media or listening to music, as the following quotation illustrates:

"That I do take the time to sit down and shut out other factors, meaning not necessarily having the phone next to me, going 'oh I am eating right now, why don’t I figure out at the same time when I have to leave tomorrow'. Things like that, to combine the eating with some other activity, because for that, I invest too much work in the food." KG3STU2

Some interviewees also spoke about an accompanying growth in reflection regarding the production process (including their own efforts in preparation) or the origin of the food they consume. These reflections seem to help curb impulsivity and allow for de-automatized responses, as well as helping to not use food as a coping mechanism. Moreover, they pave the way for more sustainable food consumption, as the following example details:

"I do not want to think so much when eating. [...] But I noticed now, I do consider - alongside my desire - a little bit more; Do I really need this right now? [...] The appetite quasi automatically decreases then. [...] When I crave sausages for example and then I look: What ingredients do they have? I think about it for some moments and it is more likely that I don’t eat it then, instead of following my first impulsive appetite." KG2STU9
However, these results were not explicitly linked to a perceived increase in ethical qualities, such as compassion, which were clearly present in the first effect category, general mindfulness.

These results were confirmed in the quantitative study, even though some effects found, on impulsivity, were not measured quantitatively (see measures section). As with general mindfulness, a 2x2 ANOVA with *experimental group* (IG-CG) and *measurement point in time* (pre-post) as factors for mindful eating were run. The ANOVA revealed a significant interaction effect $F (1,62) = 9.34, p = .001, \eta_p^2 = .131$), a significant main effect for *measurement point in time* $F (1,62) = 9.16, p = .003, \eta_p^2 = .129$) and no main effect for *experimental group* $F (1,62) < 1)$. Post-hoc t-tests indicated more mindful eating habits only after participation in the MBI, see Figure 3 (IG: $t (27) = 3.87, p < .001; d_{KORR} = .71$, see Figure 2, CG: $t (35) = -.03, p = .980$).

![Figure 3: Effects of the MBI on mindful eating](image)

*Sustainable food consumption: effects on pre-consumption phases*

Participants exhibited a multitude of effects on the pre-behavioral phases of consumption, behavior, attitude and intention, in the qualitative study while no explicit mention was made concerning a change in values. The aforementioned growth in awareness about the
production of food products was complemented in this effect category by a simultaneous rise in appreciation for the products and their availability. In some cases, this led to a change in consumption attitudes e.g.:

„When I thought about it [the food product] or thought about where it came from and what it’s made of, it seemed to be less important what I was choosing. Because then I saw value in each product, even in something as “boring” as a cheese sandwich or something. That’s why my choice got more equanimous. Just a little more relaxed.” IG2STU8

Alongside this change in attitude, the intention to consume more sustainably arose or was strengthened:

"With mindful eating, I experience the taste of every single bite with more awareness and greater appreciation, because I reflect on the origin of the products. When I then shop mindfully, I pay more heed to sustainable, organic, fair trade products." IG1STU10

"I am definitely open, more open to the topic and realized that it is good and right and spreads to many other areas […]. Be it being mindful with what I eat, what I buy or don’t buy or how I move or how I leave my environment […]." IG3STU4

"Buying organic stuff was something I wanted to do before as well, this kind of reflecting, concerning myself, how meat is produced and milk and how the animals are living and one thinks: No, that cannot be supported, even if it’s more expensive […] That was there before, but got reinforced. Through the training, yes, it got strengthened." IG3STU12

Especially the last quotation also displays an increase in compassion oriented towards others. However, the explicit effects on pro-sociality in regard to nutritional behavior remain very scarce.

The last positive effect to be described is the decrease in cravings for meat in participants who already had the intention to eat less meat for sustainability reasons before the training (e.g. animal welfare, CO2-footprint of meat):
„Because especially in the beginning I noticed that I eat with more awareness. [...] That my need for meat somehow actually decreased more." KG3STU9.

„My boyfriend had a pizza with ham or something. I realized that I felt disgust. I had that numerous times, this feeling of aversion towards meat. [...]” IGSTUX

In one case, the effect of increased awareness about one´s own behavior and the accepting and neutralizing quality of mindfulness led to a decrease in bad consciousness about consuming unsustainably, creating a potential rebound effect:

"Because I tend to have a bad consciousness when I become aware of the fact that I can’t fulfill my own [sustainability] criteria at the moment. The training [...] helps me to accept this fact better and to say: ok, it is what it is, maybe because I don’t have enough money right now to buy organic [food] only." IG1STU2

As the focus of the larger, quantitative BiNKA study was on the closure of the attitude–behavior gap, behavioral intentions were not measured in the quantitative study. For attitudes, a 2x2 ANOVA with experimental group (IG-CG) and measurement point in time (pre-post) as factors for the A-SCBNUTRITION measure revealed no significant effects whatsoever, including the interaction between group and measurement point in time (F (1,62) < 1). This means there were no changes as a consequence of the MBI in the already strongly positive attitudes (mean = 4.9 out of 6 point scale) towards sustainable food consumption (see Figure 4).
Those changes in intentions and attitudes experienced by most of the participants during and after the training did not, however, lead to a similar account of changes in actual consumption behavior. Only two specific effects in a minority of interviewees were found in the data concerning changes in actual food consumption behavior. One participant reported increased consumption of organic products after overcoming his previous preconceptions about the difference to conventional produce:

"I didn’t think much of organic products beforehand [...] I am a vegan, but hmm, I thought it was a rip-off, because it is always much more expensive and basically, it’s the same ingredients etc.” "But, hmm, lately, I have been thinking, ok, I will spend the 30 cents extra and buy the organic product instead." KG3STU3

The second effect – decreased meat consumption – is explained by two participants as being due to their heightened bodily awareness and a resulting curbed appetite for meat. This stands in contrast to their previous attempts to avoid meat consumption through discipline or other, cognitively-based strategies alone.
"With food, well (pffffff), my meat consumption, I believe, went down some more, since the beginning of the training". INTERVIEWER: "And you believe that’s due to the training?"

"Hm, yes, I believe that [...].“ KG3STU9

„It’s more of a mind thing, that I actually do like to eat meat, that I think it’s tasty, but I am often forbidding myself to eat it. Especially non-sustainably sourced meat. And in the [pizza with meat] situation, I realized, I don’t WANT that. I had this feeling of disgust.” IGSTUX

These single effects reported by three participants could not be corroborated for the whole sample in the quantitative results. The 2x2 ANOVA with experimental group (IG-CG) and measurement point in time (pre-post) as factors for the SCB_NUTRITION measure revealed no significant effects, including the interaction (F (1,62) < 1). Figure 5 illustrates that there were no changes in sustainable food consumption as a consequence of the MBI.

![Figure 5: Effects of the MBI on sustainable food consumption](image)

**Figure 5: Effects of the MBI on sustainable food consumption**

**Summarizing overview of effects**

In summary, the study revealed a multitude of effects. As can be seen in Table 2, for category one both approaches revealed the same results, namely a strong effect of the MBI on mindful
eating behavior in all participants. For the second effect category, the quantitative study only tested effects on attitudes and did not find any. However, the qualitative study inductively revealed various themes in the data and shows a more differentiated picture of attitudes and stronger, more behavioral oriented intentions. Results differ considerably in the third category, from solid effects found in the interviews to no effects for the survey data. Effects on actual consumption in terms of more sustainable behaviors were found to be sparse. Three of the interviewees reported changes in the qualitative study. However, the effect was not matched by the quantitative results.

Table 2 Summarizing overview of effects

<table>
<thead>
<tr>
<th>Effect categories:</th>
<th>I. Effects on mindful eating</th>
<th>II. Effects on sustainability-related pre-consumption phases</th>
<th>III. Effects on sustainability-related consumption behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewees:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IG1STU2</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>IG1STU10</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>IG2STU8</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>IG3STU4</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IG3STU12</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGXSTUX</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>KG2STU9</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>KG2STU17</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KG3STU2</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>KG3STU3</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>KG3STU9</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Total qualitative</td>
<td>11</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>
Note: Total quantitative results are based on the whole sample (n= 64). The effect sizes reflect a strong effect of the training on mindful eating and no effects on pre-behavioral consumption phases and behavior itself.

**Discussion**

“Your intentions set the stage for what is possible. They remind you from moment to moment of why you are practicing in the first place” (Kabat-Zinn, 1991, p. 32).

This study set out to empirically explore conjoint effects of a mindfulness training on mindful and sustainable nutritional behavior. The presented mixed methods analysis revealed strong positive effects for mindful eating (research question 1), mixed effects for pre-behavioral stages of sustainable consumption (research question 2) and only sparse evidence for changes in actual sustainable consumption behaviors (research question 3). While quantitatively the effects on the different outcomes strongly dissociate, the qualitative interviews show small, but solid evidence that mindful eating practice can in fact help pave the way to more sustainable food consumption.

In what follows, an interpretation of our results is provided according to the three effect categories of (1) mindful eating, (2) sustainability-related pre-consumption phases and (3) sustainability-related consumption behavior.

1) Concerning the first category, both qualitative and quantitative results are in line with previous studies that showed how mindfulness practice supports conscious choices and counteracts impulsivity regarding food consumption. The overall results are also in line concerning the use of food as a coping mechanism. Especially the mindfulness facets of decentering and acceptance (of the current experience) showed strong increases, as has been
shown by author studies (e.g. Keesman et al., 2017). Those findings reinforce the idea concerning the strong potential of mindfulness practice to cultivate more healthy eating habits, (as taking more time to eat and focusing exclusively on food intake), even in this healthy cohort that does not suffer from the psychological strain to change eating behavior for health reasons. Furthermore, mindful eating entailed an increased awareness of the production process and the origins of food as well as personal attitudes, intentions and eating habits. Such problem awareness and reflexivity are deemed to be preconditions for making sustainable consumption choices (Klöckner & Matthies, 2004), even though they are not directly related to actual consumer behavior. However, the facet of outer awareness did not increase, which should be taken into consideration for future designs, as especially this facet may be necessary to engage people in sustainable nutritional behavior beyond their own plates. Finally, the training may also stimulate the development of general ethical qualities considered important for acting sustainably, such as empathy and compassion. In conclusion, the intervention both promoted healthier food choices (a self-centered effect) through increased mindfulness while extending participants’ awareness for other-oriented sustainability aspects and equipping them with the emotional competencies to act accordingly.

2) Regarding the effects on sustainable pre-consumption phases regarding food, qualitative interviews revealed strong effects on attitudes and intentions. Most of the participants spoke about how their pre-existing attitudes to consume sustainable foods were either strengthened through the MBI or the general rise in awareness they experienced led them to expand their sustainability attitudes towards food as well. It seems as if even though the attitude was present cognitively among participants prior to the training, the MBI gave it a different quality or reinforcement through experience, disabling their auto-pilot. The highly positive pre-intervention attitudes evidenced in the questionnaire study support this interpretation of qualitative change instead of a quantitative rise. The interviews also revealed a rise in awareness of previously unconscious eating patterns, supporting Rosenberg’s (2004) hypothesis that increased mindfulness goes alongside more deliberate and potentially
sustainable consumption choices. Such attitude affirmation can also be construed in the sense of interconnectedness, as suggested by Thích-Nhật-Hạnh & Cheung (2012). Participants realize how their food consumption is inextricably interrelated and therefore effects the economical, ecological and social environment in which they are embedded (see for example p. 14, quote IG2STU8).

3) When regarding changes in actual consumption behavior, three out of the 11 interview participants reported effects in the qualitative study. This finding is paralleled by an absence of effects in the quantitative results. The few effects reported in the interviews, namely an increased consumption of organic food and a decrease in meat eating, were all based on pre-existing intentions to change behavior to more sustainable food choices. In the case of growth in organic food consumption, the participant reports that his intention to consume more sustainably had been dormant for a couple of years and was reactivated through the MBI. The two participants who state a decrease in meat consumption track these changes directly to their development of mindfulness, namely their heightened sense of awareness and perception of inner cues, instead of being guided by impulses that go against their intentions to reduce meat consumption. The rise in mindfulness and accompanying effects consequently seemed to support individuals in acting on their intentions deliberately, without exerting disciplinary effort.

Despite the decreasing effects from mindful eating, to pre-behavioral, to actual food consumption behavior, they turn out to be noteworthy when considering that the BiNKA training was not explicitly tailored to food consumption. As mentioned before, the intervention was not advertised as a training to support sustainable consumption behaviors nor health behaviors, but as a stress-reduction program. The findings suggest that directedness and intentions play a determining role with regards to the actual effects of an MBI. Participants related to their pre-existing attitudes on sustainable consumption when they spoke about their becoming more pronounced or expanding to different fields. As Kabat-Zinn (1991) highlights in the introductory quote, Shapiro (2006; 1992) also elaborates on the important role intentions play concerning the effectiveness of mindfulness training. He points...
out that the intention of meditators influences the outcomes of their practice. If one practices mindfulness to reduce stress, one will more likely reduce stress than change (food) consumption behavior – and vice versa. The current study’s aim was not revealed to the participants in order to avoid self-fulfilling response bias. Each participant brought their own individual intention to his or her practice, instead of there being one common “vision” necessary to unfold the full potential outcome of the practice (Kabat-Zinn, 1991, c1990). Individual intentions were collected in the data from the interviewees. They were mainly based on self-focused interests, such as stress reduction, connecting to oneself or plain curiosity about mindfulness training. They did not entail a specific wish to increase sustainable consumption through the practice, which was most likely also the case in the larger questionnaire study sample. Nevertheless, the training affected people’s eating behaviors, strengthened intentions for more sustainable nutritional behaviors and occasionally led to more sustainable food choices. Against the backdrop of the deep habitualization of eating (Köster, 2009), the various structural, social and emotional difficulties in changing one’s eating patterns (Frank, 2017) and the short amount of time people invested in the training, these are noticeable findings.

Some of the differences between qualitative and quantitative findings can be explained. First, measuring changes in attitudes towards sustainable food consumption behavior pointed to a ceiling effect. This means participants already exhibited strong positive attitudes before the beginning of the intervention and it was thus unlikely to see further increases. Second, qualitatively observed effects on the behavioral level represent single case situations that have not yet turned into new eating patterns. For this reason, general effects might not have shown up in the survey data, even though they clearly represent a promising initial step toward more sustainable food consumption behavior. Third, participants reported that the training helped them to shed light on previously unconscious aspects of their food consumption. This increase in awareness may have caused a more accurate – and slightly more negative – estimation of their eating behaviors, instead of the more positively biased responses prior to the training. In fact, such biases are particularly likely regarding potentially
unethical consumption (Gregory-Smith; Smith & Winklhofer, 2013). Moreover, it is well documented within the quantitative mindfulness research that increased awareness can lead to a more accurate self-estimation (compare for example Grossman, 2008), conferring further plausibility to this explanation.

Notwithstanding this rather positive perspective on the study’s results, the results also show that promoting sustainable nutritional behavior through mindfulness training is by no means an automatic success. Even though the potential mechanisms identified in the literature were partly found in the empirical data as well, especially with regards to decreased automaticity and awareness of ethical aspects, both study sources reveal a declining strength of effects, indicating strongest and most prevalent changes in mindful eating, while less participants reported effects on sustainability-related attitudes or intentions. Also, changes in actual sustainable or unsustainable eating behavior were individual, isolated effects and undetectable in an overall, quantitative measure.

For target groups that are looking for ways to put their other-oriented intentions into practice, or as part of sustainable consumption education programs, however, mindfulness training seems to be an auspicious catalyzer.

**Limitations**

It’s important to explicate several limitations for the understanding of the results. For one thing, the current study was part of the larger BiNKA-project which was intended to exploratively research the potential of mindfulness for education in sustainable consumption. It was thus not specifically tailored to explore effects on nutritional behavior. For both the quantitative and qualitative studies, a more comprehensive and nuanced set of measurements investigating mindful and sustainable food consumption is recommended for future research into this specific field. For example, the short version of the mindful eating scale and the newly constructed scale to assess attitudes towards sustainable nutrition showed a rather low Cronbach’s Alpha ($\alpha = .62 / .65$) pointing towards the multifaceted nature of both constructs which are not sufficiently captured in the short scales applied here. Moreover, a more
differentiated model and consequently more detailed analysis of which specific practice evokes which corresponding effect in participants will be highly valuable for more nuanced research in the future.

The quantitative measurement of mindful eating suffers from the same limitations as measuring general mindfulness, so additional rigorous research is needed to improve psychometric properties and construct validity to create valid and reliable instruments in this area. Furthermore, mixed method approaches examining changes in observable (eating) behavior through mindfulness practice, e.g. by observations or assessment of family and partners (Van Dam et al., 2018) as well as experience sampling, are highly recommended for most holistic designs. Another relevant limitation, as discussed before, is the fact that participants were not fully aware of the aim of the study, which might have prevented intentions from unfolding their full potential. However, some participants showing effects reported that they would not have taken part in the MBI, had they known its “true” aim. The attendance rate of participants that were interviewed was slightly higher than average, resulting in a possibly positive motivation bias in the qualitative sample. To extend future research beyond student populations is also recommended, to allow for greater generalizability of findings. Finally, the researchers analyzing the qualitative data are all practitioners of mindfulness themselves. Although considered an essential precondition to researching mindfulness (Grossman, 2008), there is the potential for a positive bias in data interpretation.

Conclusion

The current study set out to explore the effects of an adapted MBI on both mindful and sustainable nutritional behavior and pre-behavioral stages of consumption with a mixed method-controlled intervention study. In conclusion, it can be said that notwithstanding the rather positive perspective on the study’s results, it is clear that promoting sustainable nutritional behavior through mindfulness training is by no means an automatic success. Both qualitative and quantitative data sources reveal a declining strength of effects, indicating
strongest and most prevalent changes in mindful eating, while less participants reported effects on sustainability-related attitudes or intentions. Changes in actual sustainable or unsustainable eating behavior were individual, isolated effects and undetectable in the overall, quantitative measure. It is also important to point out again that participants relate to their pre-existing attitudes on sustainable consumption when they speak about their becoming more pronounced or expanding to different fields. In no case did participants reported a complete change of attitudes. Given the alleged importance of intentions concerning the outcome of mindfulness practice, it is questionable whether the practice can really serve to promote sustainable consumption beyond self-focused health aspects on a large scale. Future research is required to further and differentiate understanding of those first findings. For target groups that are looking for ways to put their other-oriented intentions into practice, or as part of sustainable consumption education, however, mindfulness training seems to be an auspicious catalyzer and should be considered a useful and supportive addition to existing and future programs.
References


188


Ramsenthaler, C. (2013). Was ist „Qualitative Inhaltsanalyse?“. In M. Schnell, C. Schulz, H. Kolbe, & C. Dunger (Eds.), *Der Patient am Lebensende* (pp. 23–42). Wiesbaden: Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-531-19660-2_2


v. Mindfulness Training: A Way to Engage Adolescents with Sustainable Consumption?


Abstract: A central challenge in research on education for sustainable consumption (ESC) is to develop new approaches to engage adolescents with sustainable consumption (SC) in a way that addresses not only the cognitive but also the socio-emotional and behavioral levels. Mindfulness-based interventions (MBIs) that foster awareness, (self-)reflection, and ethical values could potentially leverage learning processes in ESC. The present study was the first one to investigate the potential effects of a consumption-specific MBI on sustainable consumption behavior (SCB) in the areas of nutrition and clothing. The eight-week long intervention was carried out with 15-year old adolescents \( N = 85 \) directly at school. A randomized pre-post waitlist control group design with mixed methods was applied. The study revealed the strong effects of the adapted MBI on precursors of SCB and further effects not directly related to but potentially conducive for SCB. Actual behavioral effects were minor. Substantial inter-individual differences and inconsistencies between qualitative and quantitative results imply case-related effects that do not allow generalizable conclusions to be drawn. Nevertheless, the results of this pilot study indicate that combining mindfulness training with ESC formats appears to be a feasible and fruitful approach to engage adolescents with SC. Future practice and research should consider more diverse target groups, other consumption areas, and longer periods for interventions and their evaluation.

Keywords: education for sustainable consumption; sustainable consumption behavior; mindfulness training; adolescents; school; randomized controlled intervention study; mixed methods

1. Introduction

Finding progressive and inclusive ways to promote sustainable development is an ongoing matter of urgency [1] and changes in consumption behaviors are seen as an essential
lever on the road to sustainable development [2]. Sustainable consumption behavior (SCB) can be referred to as individual acts of people living today to satisfy their needs without in turn compromising the ecological and socio-economic conditions for the satisfaction of needs of other people and future generations [3]. Implementing education for sustainable consumption (ESC) as a part of education for sustainable development (ESD) into educational institutions has been a highly relevant strategy in order to advance SCB and achieve the sustainable development goals (SDGs) and targets formulated in the 2030 Agenda for Sustainable Development [2,4].

ESC aims at empowering learners to understand the environmental and socio-economic consequences of their behavior and, based upon this understanding, make responsible consumption decisions and take action accordingly [2,5]. However, researchers and practitioners have been challenged by the gap that persists between the high levels of pro-environmental knowledge, attitudes, or intentions (referred to as pre-stages of SCB in what follows) and actual behavior (e.g., see References [6–8]). Knowing and understanding about sustainable development issues is important, but clearly not enough to empower people to really change established and often routinized consumption patterns (see also References [9,10]). Rather, a large body of scholarly work shows that a complex variety of psychological and social factors, such as personal and social norms, values, and emotions, determine pro-environmental and pro-social behavior (for reviews and meta-analyses see References [11–14]).

To overcome the knowledge/attitude–behavior gap, ESC approaches should refrain from focusing on cognitive learning goals and the development of abstract knowledge only. Instead, a major trajectory in ESC research and practice is to advance more sophisticated ESC formats that are able to effectively address a broader range of domains and competencies. Recent ESD policy reports [15,16] suggest specific learning objectives for each and every SDG that consider not only a cognitive, but also a socio-emotional and a behavioral domain. A broader appreciation of the interrelatedness of cognitive, emotional, and motivational dispositions underpinning human behavior is also part of the debate about key competencies for sustainable consumption (SC) [17–20].

Adolescents represent an important target group for ESC since adolescence is a crucial time to intervene in the formation of unsustainable consumption habits and establish alternative ways of responsible living [21,22]. Adolescents transit from living within their family households and only partly being responsible for their consumption actions to leaving their family households and taking over an increased or even full responsibility for their
consumption choices. Moreover, they are at a stage in life characterized by more advanced reflective thinking, reasoning, and decision-making with regard to their socialization as consumers [23]. Implementing innovative and holistic ESC formats directly into formal and informal learning settings at school appears to be promising since adolescents spend large parts of their daytime at school [24].

In recent years, (E)SC researchers have begun to consider mindfulness as potentially helpful to promote SCB [25–27]. Mindfulness has its origins in about 2500-year-old Buddhist practices [28] and has become a popular topic not only in the educational field, but also in a variety of other societal and scientific domains. Most recent research that focuses on mindfulness as a facilitator of lasting individual or social transformation is informed by a more comprehensive understanding of mindfulness. It explicitly embraces cognitive aspects like attention and conscious awareness and socio-emotional or ethical qualities, such as benevolence and compassion, originally inherent in mindfulness philosophy [29–31]. Thus, mindfulness can be defined as “the unbiased awareness that emerges through intentionally and continuously paying attention to subjective momentary experience with an open, accepting, benevolent, and compassionate attitude” [32] (p. 6).

Mindfulness was introduced to the Western context as a secular practice aimed at reducing stress and promoting health and wellbeing within clinical, sub-clinical, and healthy populations. The most well-known and widespread secular mindfulness-based group program is Kabat-Zinn’s Mindfulness-Based Stress Reduction (MBSR) [33], which has been shown to effectively increase mental and physical wellbeing [34,35]. Mindfulness-based interventions (MBIs) have also been applied in educational settings and shown to have a positive influence on several cognitive, emotional, and social variables in children and adolescents (for reviews and meta-analyses see References [36–39]). Despite these promising findings, research on school-based MBIs is still in its early phase and suffering from a number of constraints. In particular, small group sizes, non-suitable study designs, and numerous unstandardized MBI formats impair the informative value of reviews and meta-analyses that only focus on quantitative studies. Qualitative and mixed-methods studies are rare although strongly needed to explore the effects of different MBIs in different contexts (see also Reference [40]).

Despite the given lack of empirical evidence, MBIs that foster awareness, (self-)reflection, and ethical values are considered promising approaches to advance learning processes in ESC and support behavior change towards more sustainability. The literature review on mindfulness and sustainable consumption by Fischer et al. [25] suggests that a key
contribution that mindfulness can potentially make to the promotion of SC is its capacity to disrupt routines and automatic behavior, increase coherence between attitudes and behavior, enhance non-materialistic values, promote wellbeing, and leverage pro-social behavior and compassion. Another literature review on the mindfulness–sustainability relationship by Wamsler et al. [26] corroborates these findings. In addition, Wamsler et al. highlight the positive influence of mindfulness on the human–nature connection, interrelatedness with others, as well as on deliberate, flexible, and adaptive responses to climate change [26]. While these reviews suggest that mindfulness could possibly contribute to SCB, in cross-sectional studies, it has also been shown that the diverse facets of mindfulness relate differently to SCB and its correlates [27,41]. Hence, (E)SC researchers are called upon to consider mindfulness as a multi-faceted construct. Moreover, it is proposed to investigate more diverse target groups and employ more sophisticated research approaches including longitudinal, mixed methods, and intervention designs to overcome existing methodological flaws in the literature [25].

First attempts have been made to infuse sustainability into the design of mindfulness-based formats, but their implementation so far remains confined to the higher education system [42,43]. Given the promising potential of mindfulness to promote SC, its proven feasibility in the school context, and the fact that adolescents represent a crucial target group for ESC, it is surprising that, to date, no study has investigated the effects of a school-embedded MBI focused on SCB in adolescents.

In order to address this research gap, we designed, implemented, and evaluated a consumption-focused mindfulness-based intervention in the context of ESC. The intervention focused on the consumption areas of nutrition and clothing. These two areas encompass everyday behaviors highly relevant in terms of ecologic and socio-economic impact and could potentially show changes in an eight-week long intervention with adolescents [3]. The aim of the present study was to assess the potential effects of the intervention (1) on SCB in the areas of nutrition and clothing as well as (2) on pre-stages of SCB (e.g., attitudes and intention), and (3) other variables not directly related to SCB (e.g., wellbeing and compassion). This study was part of the larger transdisciplinary research project BiNKA (German acronym for Education for Sustainable Consumption through Mindfulness Training) funded by the German Ministry for Education and Research (BMBF). In the BiNKA project, three different target groups were addressed: adolescents at school, university students, and employees. The school-embedded intervention as well as the applied measures were especially developed and adapted for use with adolescents. Thus, this article
only reports the results from the BiNKA school study (see further publications on BiNKA website http://achtsamkeit-und-konsum.de/en/publications2/).

2. Methods

2.1. Study Design and Procedure

A partly integrated mixed methods model [44,45] was used to account for the explorative character of the present study that sought to capture the potential effects of the MBI on SCB as holistically as possible. Quantitative and qualitative methods were integrated (1) on the level of research model with common, integrated research questions; (2) on the level of data analysis through deductive and inductive development of categories; and (3) on the level of results by consolidating the results of both study parts.

The entire grade 10 (three classes with between 27 and 29 students each) of a private secondary school in Berlin took part in the present intervention study that followed a randomized waitlist control design. The students of each class were randomly assigned to an intervention group (IG) and a control group (CG) respectively. The groups received the intervention successively, where the IGs participated first while the CGs attended normal class. The CGs received the intervention after the IGs had finished. All participants (both IGs and CGs) filled in pencil and paper questionnaires one week before the IGs started the intervention and within one week after the IGs had finished (quantitative pre-post measure). Filling in the questionnaires took between 30 and 45 min each time. Moreover, qualitative interviews of 25 to 60 min length were carried out with 14 randomly selected IG participants after the intervention (four to five out of each class). The interviews were audiotaped and transcribed verbatim. Data acquisition (both questionnaires and interviews) and the intervention were carried out at school during normal school days. Informed consent was retrieved from all parents. The students were informed about the intervention study in advance, too, but were unaware of the consumption focus of the intervention. Participation was mandatory for the students but with the opportunity to withdraw from the training at their own request at any time. The intervention was carried out between February and March of 2017.

2.2. Participants

Initially, 85 students entered the study. 15 students dropped out due to absence at the pre- or post-measurement time point (n = 5 and n = 6, respectively), or due to not having
sufficient German skills to fill out the questionnaire ($n = 4$). Attendance of at least five training sessions was set as a pre-condition to enter data analyses, which was met by all non-dropouts. The remaining 70 students ($n_{IG} = 39, n_{CG} = 31$) had a mean age of $m_{age} = 15.3$ years (SD = 0.5, range 14–17), 27 of them were female, and 28 of them had had prior meditation experience (mostly one-time experiences). It can be assumed that the participants were already confronted with sustainability and global issues before the study, since ESD and the SDGs were firmly anchored in their school curriculum. At the time of the study, the students were in the middle of the preparation for their junior high school exams at the end of grade 10 (MSA).

Six female and eight male students were selected for the interviews. Their age, gender, and prior meditation experience resembled the distribution in the entire sample. The participation rate of all interviewees in the course was high. The rating of their overall satisfaction with the course and the times of meditation practice per week were as mixed, as was the whole IG sub-sample. See Tables 1 and 2 at the end of the results section for an overview of sample characteristics and control variables.

### 2.3. Intervention

The consumption-specific mindfulness-based intervention ("BiNKA training") was structured according to the well-established MBSR program [33,46] and taught by a certified MBSR trainer. The intervention consisted of eight weekly group sessions of 90 min, one half-day session of four hours ("Day of Mindfulness"), and 15 min of daily meditation practice at school or at home supported by audio files recorded and provided by the trainer. The first four weeks of the training focused more on mindfulness-specific topics and the establishment of a meditation practice, whereas the second half of the training increasingly addressed consumption-related topics and exercises (see Reference [47] for more information concerning the training development and contents, and Reference [48] for some practical exercises).

Different exercises formed part of the training. An emphasis was put on teaching different kinds of meditation such as body scan, breathing meditation, and loving-kindness meditation ("metta"):

- **Body scan**: A mindfulness exercise where participants are guided to move through their bodies with their awareness and feel into every body part, step by step, and just perceiving without judging.
• **Breathing meditation**: A mindfulness exercise where the awareness is focused on the breath felt in the body, e.g., in the belly. Participants are invited to just observe thoughts and emotions that come up and to let them go and refocus on the breathing again and again.

• **Metta meditation**: A mindfulness exercise for cultivating kindness, compassion, and love, in a first step for oneself, thereafter for other human beings, animals, and nature. Internally, sentences like, “May all the beings in the world be happy” are repeated many times. This exercise was referred to as “heart-opening” meditation throughout the study.

Moreover, imaginary journeys, mindful movements, and discussions about mindfulness- or consumption-related topics were included as guided exercises. Additionally, the participants were invited to practice mindfulness in their everyday lives (e.g., mindful eating and mindful shopping) and to do small tasks at home and during sessions in a booklet they were handed out. Two example exercises that combined mindfulness and consumption in the areas of clothing and nutrition were:

• **Jeans journey**: Originally an ESC-format that was transferred into the context of mindfulness. It is an imaginary journey through the different stages of the production of a pair of jeans, from cotton picking to selling it in a shop. Participants are invited to concentrate on sensual perceptions like the feeling of fabric of their clothes on their skin during the journey.

• **Mindful eating**: A mindfulness exercise to practice eating in silence and without any distraction. The focus is on the color, the texture, the smell, and the taste of their food. Mindful eating was practiced in the course (in conjunction with the so-called “raisin exercise”, a classical exercise out of the MBSR program that was practiced using a mandarin with the students), during the Day of Mindfulness, and at home.

2.4. Measures and Analysis

2.4.1. Quantitative Study

Prior to data analysis, all questionnaires were manually checked for answering patterns and, if detected, the entire scale was set missing for that case. Reversed items were recoded and internal consistency for all applied measures was checked. If Cronbach’s α was below 0.5, confirmatory factor analyses were calculated in order to investigate the factor structure of the scale. Means of scales or subfacets were calculated for pre- and post-measures.
Afterwards, zero-order correlations of all scales for the pre-means as well as $2 \times 2$ ANOVAs with a measurement point in time (pre-post) and experimental group (IG-CG) were run for the measures listed below. Data were analyzed using the software IBM SPSS Statistics 25.

- **Sustainable consumption behavior** (SCB) in the areas of nutrition and clothing was assessed using the Young Consumers’ Sustainable Consumption Behavior (YCSCB) scale [49] that is based on the cube model of SCB [3]. The nutrition subscale spans 14 items (Cronbach’s $\alpha = 0.77$; e.g., “I buy organic food products.”), the clothing subscale has 13 items (Cronbach’s $\alpha = 0.87$; e.g., “I choose clothing items from fair trade production.”). Items were assessed on a seven-point Likert scale with every second option labelled as “never” (0), “sometimes” (2), “often” (4), and “always” (6).

- **Sustainable consumption attitudes** in the areas of nutrition and clothing were assessed by two self-constructed subscales that reflected the main consumption aspects covered in the respective SCB scales (nutrition: $n = 8$, Cronbach’s $\alpha = 0.65$, e.g., “Fair food pricing for local producers and farmers is important.”; clothing: $n = 6$, Cronbach’s $\alpha = 0.79$, e.g., “To borrow or swap clothes with others is a good thing to do.”). Items were assessed on a seven-point Likert scale with every second option labelled as “completely disagree” (0), “rather disagree” (2), “rather agree” (4), and “completely agree” (6).

- **Material values** were assessed using the German Material Values Scale—Youth (G-MVS-Y; [50]), which was developed and validated based on the German adult version [51] of the original scale on value orientation for materialism by Richins and Dawson [52]. The G-MVS-Y spans 10 items (Cronbach’s $\alpha = 0.88$, e.g., “The things you own predicate a lot about how successful you are.”) and was assessed on the same Likert scale as SC attitudes (see above).

- **Compensatory consumption** was measured by a scale by Lange, Choi, and Ademczyk [53]. It encompasses nine items (Cronbach’s $\alpha = 0.81$) on impulsive and compulsive buying that is unconsciously triggered to compensate for unfulfilled needs (e.g., “Sometimes I realize that something within me has pushed me to go shopping.”). Items were assessed on the same Likert scale as SC attitudes (see above).

- **Wellbeing** was assessed by the core module taken from the guidelines on how to measure subjective wellbeing by the OECD [54]. It spans five items (Cronbach’s $\alpha = 0.76$) on general life satisfaction, meaningfulness of one’s actions in life, and emotional aspects (e.g., “How happy have you felt over the last four weeks?”). Items were assessed on an
11-point Likert scale used by the OECD ranging from “not at all” (0) to “completely” (10).

- **Mindfulness** was measured by the German translation of the Comprehensive Inventory of Mindfulness Experiences—Adolescents (CHIME-A, [55]), which again was based on the German CHIME for adults by Bergomi, Tschacher, and Kupper [56]. The CHIME-A originally spans 25 items, which parse into eight sub-facets of mindfulness. In the present study, the following three subscales that reflect mindful awareness were considered relevant in terms of their correlation with SCB [41]: “Awareness of Internal Experiences” (three items, Cronbach’s α = 0.74, e.g., “When my mood changes, I notice it straight away.”), “Awareness of External Experiences (three items, Cronbach’s α = 0.78, e.g., “I notice details in nature (like the colour of the sky, or the shape of trees and clouds).”), and “Acting with Awareness” (three items, Cronbach’s α = 0.65, e.g., “I get distracted by memories or daydreams.”). Analyses were based on the mean values of the three subscales, respectively. The items were assessed on the same Likert scale as SCB with the instruction to consider the past two weeks when answering the question.

- **Mindful eating** was measured by a short version of nine items of the Mindful Eating Questionnaire by Framson et al. (MEQ; [57]), reflecting the four factors disinhibition, awareness, distraction, and emotional response. The items were assessed with the instruction to consider the past two weeks using a seven-point Likert scale where only the extremes where labelled, with “almost never” (0) and “almost always” (6). Cronbach’s α for the nine items revealed an unsatisfying value of 0.39. Confirmatory factor analyses suggested a two-dimensional model instead of a unidimensional one and the exclusion of two items (CFI = 0.961, TLI = 0.938, and RMSEA = 0.05). Thus, the following analyses were run for the two sub-factors respectively, one reflecting emotional aspects (four items, Cronbach’s α = 0.69, e.g., “When I’m sad, I eat to feel better.”), the other one reflecting more cognitive aspects (three items, Cronbach’s α = 0.54, e.g., “Before I eat, I take a moment to appreciate the colors and smells of my food.”).

- **Compassion** was measured using a scale taken from Shiota, Keltner, and John [58]. It spans five items (Cronbachs α = 0.78) and addresses the behavioral aspect of wanting to help others (e.g., “If I see someone suffer or in need, I feel the strong urge to take care of that person.”). The same Likert scale as for SC attitudes was used (see above).

- **Connectedness to nature** was assessed using the Connectedness to Nature Scale—Adolescents (CNS-A), which was developed and validated by Götting et al. [59] based
on the German version [60] of the original Connectedness to Nature Scale by Mayer and Frantz [61]. The scale spans 10 items (Cronbach’s $\alpha = 0.88$, e.g., “All living beings in the world are connected and I feel like a part of it.”), which were assessed on the same Likert scale as SC attitudes (see above).

2.4.2. Qualitative Study

The interviews took place in silent rooms at school and were carried out by two interviewers (seven interviews each). To ensure objectivity between the two interviewers and check the quality of the interview guideline, both interviewers were present at the first two interviews, one leading the interview, the other one taking part as a silent observant, respectively. In retrospect, only minor linguistic changes were made to the guideline, so that the first interviews were comparable with the following interviews and were therefore included in the overall analysis.

The interview guideline was semi-structured [62] with 21 main questions (including sub-questions) and optional questions to dig deeper whenever necessary. The guideline was partly informed by the quantitative questionnaire and consisted of three parts: In the first part (A), participants were asked open questions about their personal experience with the course and the course elements. The second part (B) contained more specific questions about wellbeing, consumption, and mindfulness. In the third part (C), participants were asked about their attitude towards nature and the environment. Specific questions concerning the effects of the course elements and the influence of parents and peers were included, too. At the beginning of each interview, participants were asked for their consent to the recording and reminded of their voluntary participation and the right to refuse answers or to end the interview at any time.

Data were analyzed using structured content analysis after Kuckartz [63] and the software package MAXQDA. Deductive and inductive methods were combined to develop the coding scheme. Deductive categories were derived directly from the research questions and the interview guideline. Inductive categories were added during the coding procedure using in vivo coding to account for unexpected effects. Inter-coder reliability was ensured through communicative validation after Flick [64]. Three independent coders coded the first interview and then compared the assigned categories between them. Deviating and unclear codings were discussed and clarified in order to ensure a standardized coding of the remaining material, which was then carried out by two student assistants. Coding rules allowed multiple categories to be assigned to one text passage. Coded text passages were
then paraphrased and summarized by a senior researcher for each category and for each case (i.e., participant), respectively. To elucidate whether the effects were individual phenomena or applied to a larger part of the group, the number of statements about certain effects in the sample was also recorded.

3. Results

The results are structured according to the main objectives of the study: (1) effects of the MBI on SCB, (2) effects on pre-stages of SCB, and (3) further effects not directly related to SCB. For each subsection, the quantitative results are reported first, followed by the qualitative results including the evaluation of the training elements. For a short summary and an overview of quantitative and qualitative effects including quantitative descriptives, see Section 3.4 and Tables 1 and 2 at the end of results section. First order correlations of all variables at pre-intervention points are displayed in Table A1 in the Appendix A.

3.1. Effects on SCB

The quantitative study across the whole cohort revealed a significant two-way interaction between the group and measurement point in time for food-related SCB ($F(1,67) = 5.13, p = 0.027, \eta_p^2 = 0.071$; see Figure 1), but not for clothing-related SCB ($F(1,67) < 1$).

![Figure 1. Two-way interaction effect on food-related SCB.](image)

In the interviews, 2 out of 14 participants mentioned effects on consumption behavior, one each in the consumption areas of food and clothing. One person abstained from eating meat for one month and explicitly referred to the discussions during the training as a driver of this decision. He also encouraged his parents to buy more Fairtrade products.
“Not the EXERCISES, but more the things, like mindful eating, that has become a bit more clear to me, because we talked about it more. [...] and that’s why I’m trying to be a vegetarian for a month now, [...] because of the discussions about factory farming.” IG3SCHU12

Another person decided to repair a pair of riding boots that she would have had thrown away before taking the training. Moreover, she stated that she and her family now paid more attention to SC in their everyday life and had actively searched for background information about certain brands or products. For that person, the training as a whole had influenced this behavior change. No other behavioral effects were mentioned in the interviews.

“[…] now I had three pairs of riding shoes and one pair was pretty broken, and I would have said: Okay, nobody needs them anyway and I would have thrown them away. But now I repaired them a little bit with my dad and then someone really wanted to have them and uses them now. [...] And before the course I would have said: [...] They can be thrown away now.” IG3SCHU2.

3.2. Effects on Pre-Stages of SCB

In the quantitative study, no significant two-way interactions between the group and measurement point in time were found for SC attitudes (food and clothing: $F(1,67) < 1$), material values ($F(1,67) < 1$), or compensatory consumption ($F(1,68) < 1$).

In the qualitative study, several effects were described by the participants. The majority of the participants stated that the training had increased their awareness of SC issues (mostly of what they already had known prior to the training) and given them impulses for deeper reflection of the topic and their own behavioral patterns. Some interviewees also mentioned their strengthened intention to explicitly pay more attention to what they buy/eat and to consume more sustainably in the future.

“[…] it’s just been brought back to your awareness where it comes from, well we already know that. But you forget that at some point and you no longer think about it. Yes. And then you get reminded of it, so to speak.” IG2SCHU10

“I see sustainable consumption has become more important to me now than before. So, it just became clearer to me again that one should pay attention to it.” IG3SCHU2
The course elements most often mentioned in relation to these effects on pre-stages of SCB were the discussion exercises and the jeans journey. Other elements mentioned by the interviewees as stimulating were the tasks in the booklet, the questionnaires, the mindful shopping exercise, and the course as a whole.

“[...] we once had a session where we should think about where our pants actually come from, how many of such stages they actually go through and what happens AFTER we have used them. And I actually found that quite interesting, because [...] if you go to H&M and you buy your pants there, you know somehow where they come from, from children for children, but... you never make it that CONSCIOUS.”
IG1SCHU8

The three kinds of meditation were mentioned much less in terms of consumption-related effects. Two participants stated that the heart-opening meditation (“metta”) had changed their perception of SC and that the body scan had had an influence on their increased awareness and reflection of SCB. The other interviewees did not relate the meditations to SC.

“[..] I think, if you would do it [heart-opening meditation] at several schools, I think [...] that you could achieve something like this [sustainable consumption].”
IG2SCHU2

“It was just that we did the body scan and then I was relaxed and listened more to these topics afterwards.” IG3SCHU12

Two persons stated potentially counterproductive effects of the intervention regarding pre-stages of SCB. One participant indicated that he felt encouraged to attach value to sustainability, which for him meant having more pleasure and not to be too strict in his consumption decisions. He also explained that the course made him aware of the importance of being mindful with people in his immediate surrounding rather than with people in Bangladesh, for example. Both developments could have a potentially negative effect on SCB in that case.

“For example, it was said, “Sustainable consumption—take your time for it!” And I just thought that one should just enjoy and that was just confirmed again and that, yes. I think that’s good now and I thought it was good before and now it’s definitely going to happen. And now I’ve convinced others that [...] it is good to enjoy and one should not be stiff and say, “yes, I must live sustainably now—whatever may come.” IG2SCHU7.
“[..] this understanding for example of what mindfulness is, e.g., food and where does our clothes come from—that for me has fallen behind a bit. [..] because this mindfulness towards ME or towards others. I kind of put a little bit of focus on that. So now is the time to be mindful in the IMMEDIATE surroundings. Because I think it’s just a lot more powerful than [..] saying I want to somehow (---) change my clothes to be mindful towards people in Bangladesh, for example. I think it gets there very filtered and if you are more friendly to people here, with a smile towards them, I think that’s just much more intense and you get the direct feedback”. IG2SCHU7

Another single participant pointed out that in her opinion, the topic of consumption was generally too present and, thus, the consumption focus of the training was too strong:

“[..] in the meantime I simply find this topic so uninteresting because it’s a constant issue. We should consume less, we should consume less. [..] I found it interesting the first few times actually [..] but now somehow it is a topic, which has been discussed so often. At school or in general, that it just [..] doesn’t take effect with me anymore.” IG1SCHU8

3.3. Further Effects Not Directly Related to SCB

The quantitative analyses revealed a significant two-way interaction between the group and measurement point in time for compassion (F(1,64) = 4.67, p = 0.034, ηp² = 0.068; see Figure 2). However, no significant interaction effects were found for wellbeing (F(1,64) = 2.17, p = 0.145, ηp² = 0.033), mindful awareness (Fs(1,67) < 1), mindful eating (Fs(1,65) < 1), or connectedness to nature (F(1,68) = 2.36, p = 0.129, ηp² = 0.034).

![Figure 2. Two-way interaction effect on compassion.](image-url)
The interviews, on the other hand, revealed several effects that may be indirectly related to consumption. All interviewees stated effects on their wellbeing in terms of increased relaxation, decreased stress, and regained energy.

“[…] I was just happy, after the meditation I felt so good. […] I was just full of energy. I was also a bit tired (Int: Mhm), but when this tiredness faded, I was very energetic […] I had energy for school, for sports, well. For example, on Thursday [note: after Day of Mindfulness], after that I went climbing and climbed really difficult routes because I was just so (Int: Mhm) very focused […]” IG2SCHU4

The majority of them mentioned body scan and the breathing meditation as sources for the increased wellbeing, while some of them also credited the heart-opening meditation, the Day of Mindfulness, or the course as a whole.

“It was very relaxing to just concentrate on the different parts of the body. […] This meditation time was more like, uh, a short break from all the hustle and bustle.” IG2SCHU10

“[…] I did have the feeling that when you were tense somehow and then tried (--) to “breathe it out,” so to speak, or to concentrate on that then, uh (-) that it somehow had an effect, I thought it was blatant.” IG3SCHU14

However, one participant stated that the effects of meditation on her wellbeing depended on her mood before meditation. When she went into meditation in an unhappy mood, she felt worse afterwards. Especially the heart-opening meditation made her wallow in self-pity on more than one occasion.

“[…] I usually felt better afterwards, but there were moments when I felt worse afterwards. Where I felt really bad, because during the meditation I was suddenly like this: Hey, who is actually doing me something good or I, hm, whom, whom am I actually doing something good and does it also come back or is it just one-sided. And somehow I drifted a bit into self-pity sometimes.” IG1SCHU2

More than half of the participants stated that the training had affected their perception and self-reflection. The awareness of internal and external perceptions was increased (e.g., becoming aware of thoughts, bodily sensations, or details in the surroundings), the reflection of needs deepened, and the participants regained focus and concentration more easily. The meditations in general, especially the body scan, and the training as a whole were seen to have led to these effects.
“Mentally, I’d say you were just a little like tidied up, I don’t know. You just [...] reflected about yourself again, [...] and just perceived yourself more and what you need or don’t need right now or what you want to do now and that helped you a bit, I’d say.” IG2SCHU11

Almost half of the participants reported effects of the training on mindful eating. They paid more attention to what they ate and how because of participating in the course. In addition, enjoyment of food and eating became more important. Some of the participants stated that they had tried mindful eating at home with their family and that they intended to eat mindfully more frequently in the future. Exercises considered to be particularly beneficial to mindful eating were the mandarin exercise, the Day of Mindfulness, and the course as a whole.

“[…] we were supposed to close our eyes and then we got something in our hands, such a mandarin and we were supposed to eat it consciously, so we unpacked it and didn’t know what it was, and then we ate it. […] Since then, when I eat something [...] I TRY to really pay attention to what I eat. And to really like enjoy it.” IG1SCHU8

For half of the participants, the interviews revealed effects related to communication and interaction with others, mostly as a result of their increased (self-)perception. Some stated that they could perceive and regulate their emotions more easily and that this take-away from the course had already had a direct influence on how they argued with parents or siblings for example. Some others mentioned that they had learned to listen more mindfully and that they cared more for what others had to say and were more open to it. Moreover, one person reported that she felt more connected to nature. These effects were mostly related to the course as a whole.

“[…] because now I have learned [...] especially with negative feelings, to just perceive them somehow [...] well it’s not that, [...] that I have less negative feelings, but to simply notice them [...] and that helps me to deal with them in a better way. So, it was especially noticeable in the middle of the course that I argued a lot less with my little brother.” IG1SCHU8

“I am definitely more open to other people and I also have the feeling that if you pay attention to it a little bit, then other people will also open up towards you. And that makes it easier to be mindful towards others.” IG2SCHU7
“Um, yeah, after the course I perceived more elements so to speak. Like the wind whistled through my hair or how the Sun came out or single rays of sunshine were on me, I think you/so I felt connected to nature in a very DIFFERENT way.”

3.4. Summary of Quantitative and Qualitative Effects

The quantitative analyses revealed significant two-way interactions between the group and measurement point in time for SCB in the area of food as well as for compassion. For the latter, the effect was evoked by a decrease in the control group only. All other measures did not reveal any substantial or significant effects.

The qualitative analyses of 14 semi-structured interviews with randomly selected participants revealed strong effects on pre-stages of SCB and other variables not directly related to SCB. Actual behavioral effects, on the other hand, were minor. Nearly all interviewees reported an improvement of their awareness, their wellbeing, and their ability to reflect on consumption issues. Moreover, about half of the interviewees showed effects on self-perception and reflection, mindful eating, and social aspects such as interaction and communication with others. Only two participants stated changes in actual behavior.

The quantitative results for all applied measures as well as the qualitative effects for all interview cases are displayed in Tables 1 and 2.

**Table 1.** Means, standard deviations, and results of the two-way ANOVAs with repeated measures and experimental group as a between-subject factor for all applied measures.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Group</th>
<th>n</th>
<th>Pre M</th>
<th>Pre SD</th>
<th>Post M</th>
<th>Post SD</th>
<th>F (df)</th>
<th>p *</th>
<th>ηp²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times of participation</td>
<td>IG</td>
<td>39</td>
<td></td>
<td></td>
<td>7.8</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction with course ¹</td>
<td>IG</td>
<td>39</td>
<td></td>
<td></td>
<td>5.8</td>
<td>2.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekly meditation practice ²</td>
<td>IG</td>
<td>39</td>
<td></td>
<td></td>
<td>2.7</td>
<td>1.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>food</td>
<td>IG</td>
<td>39</td>
<td>2.94</td>
<td>0.77</td>
<td>3.18</td>
<td>0.77</td>
<td><strong>5.13 (1,67)</strong></td>
<td><strong>0.027</strong></td>
<td><strong>0.071</strong></td>
</tr>
<tr>
<td></td>
<td>CG</td>
<td>30</td>
<td>3.14</td>
<td>0.93</td>
<td>3.08</td>
<td>0.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>clothing</td>
<td>IG</td>
<td>39</td>
<td>2.36</td>
<td>1.00</td>
<td>2.80</td>
<td>0.91</td>
<td>0.49 (1,67)</td>
<td>0.484</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>CG</td>
<td>30</td>
<td>2.20</td>
<td>0.97</td>
<td>2.51</td>
<td>0.89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC attitudes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>food</td>
<td>IG</td>
<td>38</td>
<td>4.26</td>
<td>0.79</td>
<td>4.09</td>
<td>0.94</td>
<td>0.41 (1,67)</td>
<td>0.625</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>CG</td>
<td>31</td>
<td>4.25</td>
<td>0.82</td>
<td>4.18</td>
<td>0.86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>cb</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>-----------------------</td>
<td>----</td>
<td>-----------</td>
</tr>
<tr>
<td>clothing</td>
<td></td>
<td>38</td>
<td>4.49</td>
<td>1.15</td>
<td>4.56</td>
<td>1.19</td>
<td>0.18 (1,67) 0.894 0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material values</td>
<td></td>
<td>31</td>
<td>4.38</td>
<td>1.10</td>
<td>4.48</td>
<td>1.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compensatory consumption</td>
<td></td>
<td>38</td>
<td>2.07</td>
<td>0.96</td>
<td>2.27</td>
<td>1.03</td>
<td>0.06 (1,67) 0.811 0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wellbeing</td>
<td></td>
<td>31</td>
<td>2.43</td>
<td>1.30</td>
<td>2.58</td>
<td>1.26</td>
<td>0.000 (1,65) 0.894 0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material values</td>
<td></td>
<td>39</td>
<td>2.06</td>
<td>1.01</td>
<td>2.28</td>
<td>1.26</td>
<td>0.44 (1,68) 0.507 0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compensatory consumption</td>
<td></td>
<td>31</td>
<td>2.43</td>
<td>1.12</td>
<td>2.51</td>
<td>1.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wellbeing</td>
<td></td>
<td>28</td>
<td>5.60</td>
<td>2.24</td>
<td>5.20</td>
<td>1.70</td>
<td>2.17 (1,64) 0.145 0.033</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mindfulness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA-internal</td>
<td></td>
<td>39</td>
<td>3.92</td>
<td>1.07</td>
<td>3.81</td>
<td>1.15</td>
<td>0.00 (1,67) 0.966 0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA-external</td>
<td></td>
<td>30</td>
<td>4.14</td>
<td>1.25</td>
<td>4.04</td>
<td>1.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA-acting</td>
<td></td>
<td>39</td>
<td>3.44</td>
<td>1.37</td>
<td>3.50</td>
<td>1.46</td>
<td>0.56 (1,67) 0.458 0.008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mindful eating (ME)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME-emotional</td>
<td></td>
<td>38</td>
<td>3.32</td>
<td>1.44</td>
<td>2.94</td>
<td>1.31</td>
<td>0.27 (1,65) 0.608 0.004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME-cognitive</td>
<td></td>
<td>29</td>
<td>3.12</td>
<td>1.47</td>
<td>2.89</td>
<td>1.35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compassity</td>
<td></td>
<td>39</td>
<td>1.98</td>
<td>1.08</td>
<td>2.34</td>
<td>1.36</td>
<td>0.03 (1,65) 0.873 0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connectedness to nature</td>
<td></td>
<td>37</td>
<td>4.53</td>
<td>1.07</td>
<td>4.57</td>
<td>1.08</td>
<td>4.67 (1,64) 0.034* 0.068</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>29</td>
<td>4.34</td>
<td>0.99</td>
<td>4.02</td>
<td>0.86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>39</td>
<td>2.99</td>
<td>1.28</td>
<td>2.81</td>
<td>1.22</td>
<td>2.36 (1,68) 0.129 0.034</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>31</td>
<td>3.02</td>
<td>1.27</td>
<td>3.27</td>
<td>1.34</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. IG = intervention group. CG = control group. n = number of participants. M = group mean. SD = standard deviation. F(df) = F-values and degrees of freedom. *p-value < 0.05. \( \eta^2 \) = effect size/partial eta-squared. \(^1\) On a scale from 0 (“Could really have done without it”) to 10 (“total success, anytime again”). \(^2\) Times per week. SCB = sustainable consumption behavior. SC = sustainable consumption. MA-internal = awareness of internal experiences. MA-external = awareness of external experiences. MA-acting = acting with awareness.
Table 2. Summarizing overview of characteristics of interview participants and qualitative effects.

<table>
<thead>
<tr>
<th>Token</th>
<th>Age</th>
<th>Sex</th>
<th>Meditation Experience</th>
<th>Times of Participation</th>
<th>Satisfaction with Course *</th>
<th>Weekly Meditation Practice **</th>
<th>I. SCB ¹</th>
<th>II. Pre-Stages of SCB ²</th>
<th>III. Further Effects ³</th>
</tr>
</thead>
<tbody>
<tr>
<td>IG1SCHU2</td>
<td>15</td>
<td>Female</td>
<td>Yes</td>
<td>9</td>
<td>8</td>
<td>5</td>
<td>X</td>
<td>X/O</td>
<td>X</td>
</tr>
<tr>
<td>IG1SCHU6</td>
<td>15</td>
<td>Female</td>
<td>Yes</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG1SCHU8</td>
<td>15</td>
<td>Female</td>
<td>Yes</td>
<td>8</td>
<td>7</td>
<td>3</td>
<td>X/O</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG1SCHU9</td>
<td>15</td>
<td>Male</td>
<td>No</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG2SCHU1</td>
<td>16</td>
<td>Male</td>
<td>No</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG2SCHU2</td>
<td>16</td>
<td>Female</td>
<td>No</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG2SCHU4</td>
<td>16</td>
<td>Male</td>
<td>Yes</td>
<td>9</td>
<td>8</td>
<td>2</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG2SCHU7</td>
<td>15</td>
<td>Male</td>
<td>Yes</td>
<td>8</td>
<td>4</td>
<td>3</td>
<td>O</td>
<td>O</td>
<td>X</td>
</tr>
<tr>
<td>IG2SCHU10</td>
<td>15</td>
<td>Female</td>
<td>Yes</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG2SCHU11</td>
<td>15</td>
<td>Male</td>
<td>No</td>
<td>9</td>
<td>8</td>
<td>1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG3SCHU2</td>
<td>15</td>
<td>Female</td>
<td>Yes</td>
<td>9</td>
<td>6</td>
<td>1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG3SCHU7</td>
<td>15</td>
<td>Male</td>
<td>No</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG3SCHU12</td>
<td>15</td>
<td>Male</td>
<td>No</td>
<td>8</td>
<td>4</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>IG3SCHU14</td>
<td>16</td>
<td>Male</td>
<td>No</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Note. * On a scale from 0 (“Could really have done without it”) to 10 (“total success, anytime again”). ** Times per week. ¹ Effects on sustainable consumption behavior. ² Effects on pre-stages of sustainable consumption behavior. ³ Further effects not directly related to sustainable consumption behavior. Intent. = intention to change behavior. Aware./Reflect. = awareness and reflection. WB = wellbeing. Percept./Reflect. = perception and self-reflection. ME = mindful eating. Comm./Interact. = communication and interaction. X = positive effect. O = potentially counterproductive effect.
4. Discussion

The aim of the present study was to identify the potential effects of a consumption-specific MBI on SC. The intervention was carried out with about 15-year-old adolescents directly at school and a randomized waitlist control design was used. To account for the explorative character of this pilot study, a partly integrated mixed methods model with quantitative and qualitative methods was applied. In sum, no generalizable conclusion can be drawn for the entire sample. Nevertheless, the results point to a number of impacts of the MBI on SC (especially its pre-stages) at an individual level as well as to further case-specific influences of mindfulness training. In what follows, the results will be discussed considering the effects on SCB and its pre-stages, as well as further effects not directly related to SCB.

Regarding SCB, a small quantitative interaction effect was found for the consumption area of food but not for clothing, whereas the qualitative study revealed two single effects, one in each consumption area. Thus, behavioral effects were rather sparse, but can be cautiously interpreted as first indications of a potential influence of the MBI on actual consumption behavior. Taking into account the qualitative findings, both cases with behavioral effects mentioned that the intervention had affected their intention to change their consumption behavior. According to behavioral theories like the “Theory of Planned Behavior”, the formation of such intentions can be seen as an important pre-condition for behavior change [65]. Nevertheless, effects of the MBI on intention were sparse in general. There are several possible explanations for this finding. One should take into consideration that consumption behavior in adolescents is strongly influenced by their social surroundings (families and peers), as well as their available budget. In the present sample, the school had a curriculum oriented towards sustainability and global issues, and the prior level of awareness and pro-environmental behaviors in the students and their families may have already been relatively high. For example, the interviews revealed that many parents already bought organic and Fairtrade products, therefore their children already consumed sustainably to a certain extent, even though not necessarily on purpose. Moreover, buying secondhand clothes or swapping clothes was an already well-established routine among the students, especially among the female participants. This behavior seemed to be motivated by factors like low costs, having fun, and going with the Berlin trend, and not necessarily by sustainability reasons. Nevertheless, these circumstances could be reasons for seeing no need to change their consumption behavior. Moreover, most of the students mentioned that SC was important to them, but that they did not know what to do to bring change forward. Some
also said that they did not feel responsible for bringing about changes towards sustainability. Future intervention studies might have to treat people differently according to the pre-behavioral stage of behavior change they are in as it is suggested in environmental and health psychology approaches [66,67].

Despite the sparse effects on intention and behavior, the qualitative findings suggest that the MBI was effective in raising many students’ awareness for SC in general, bringing prior knowledge back into awareness, and giving them impulses to reflect on the topic and their SC behaviors and attitudes. This was contrasted by quantitative null-effects for the measures of SC attitudes, material values, and compensatory consumption. The null-effects could be explained by a ceiling effect in SC attitudes (i.e., the students already rated their SC attitudes high at pre-intervention measurement) and floor effects for material values and compensatory consumption (i.e., students already started low in these measures). At best, the increase in SC-related awareness and reflection in a sample with highly pro-sustainable and non-materialistic values may result in more sustainable consumption behaviors in the future. Nevertheless, the consumption focus of the MBI may also bore or put off students because of their prior levels of SC knowledge or values, which could be either high or low. It remains an open question for which target group a consumption-focused MBI might be more suitable.

Regarding the different course elements, the students did not directly relate the meditations to the effects in SCB or its pre-stages. Instead, especially the jeans journey, which combined mindfulness and ESC, and the in-course discussions were mentioned. This can be seen as an indicator for the appropriateness of the consumption focus of the MBI and that a standard MBSR course would not have shown the same SC-related effects. Combining mindfulness-based and ESC formats, as well as facilitating SC-related discussions in the protected setting of a mindfulness course where the students can express their feelings and opinions without stress or the pressure to perform, appears to be very promising and should be extended in future intervention studies. The strong qualitative effects found for wellbeing and further effects not directly linked to SCB support this suggestion.

For all interviewed students, the course was a source for wellbeing in terms of increased relaxation, decreased stress, and regained energy. In many cases, this came along with an improved ability to focus and concentrate, which is in line with the results of a meta-analysis on MBI studies at school that found the strongest effects for cognitive performance and stress resilience [38]. Both aspects are important pre-conditions for comprehensive listening and insight in learning settings. Moreover, earlier research shows a positive relationship of wellbeing and SCB [68]. Nevertheless, the null-effect on the wellbeing measure in the
quantitative study did not support the findings in the qualitative study. This could be because the applied measure covered different aspects of wellbeing like general life satisfaction, perceived meaningfulness, and emotional aspects. In addition, the students were preparing for their junior high school exams and might have benefited more from the MBI in terms of their cognitive performances and their ability to cope with pressure as reflected in the qualitative findings. One interviewee also mentioned that her wellbeing after the meditation depended on the mood with which she entered the meditation, i.e., a bad mood was even reinforced through meditation sometimes. Even if this was just a single case, it shows that not everyone will benefit from the meditation practice with regard to their emotional wellbeing.

In the qualitative study, almost all participants mentioned effects of the MBI on their perception, self-awareness, and reflection, which in turn affected their ability to better regulate emotions, as well as their communication and interaction patterns with others. These effects can be interpreted as a potential pathway between mindfulness and the development of cognitive and socio-emotional key competencies as aimed for in ESC [15,17,18]. The qualitative effects were contrasted by quantitative null-effects for the mindful awareness facets, which were similar to the effects found in the adult study of the BiNKA project. Mindfulness scholars are discussing appropriate definitions and measurements of mindfulness and underline the importance of not only using quantitative measures for this highly individual practice and experience [30,40,69]. Moreover, other intervention studies with adolescents have also failed to find significant quantitative effects in general (e.g., Reference [70]), which might not only be due to the wrong “recipe” concerning the interventions as suggested by Johnson et al. [70], but also to the lack of appropriate scales. The small interaction effect found for compassion was only provoked by a decrease in the control group, whereas the intervention group did not rise in compassion. A recent review and meta-analysis on the relationship of meditation and compassion and/or pro-social behavior reveals that the effects of meditation on these variables are very limited due to methodological biases and theoretical problems in this research field [71].

In addition, about half of the interviewees mentioned effects on mindful eating, whereas the quantitative study found no effects on that variable. The quantitative null-effect must be interpreted with caution, since the scale suffered from psychometric problems (see methods) and, analogous to the measurement of mindfulness, sophisticated scales for adolescents are still missing. In general, with regard to SC, finding effects on mindful eating is two-folded. On the one hand, mindful eating might be an effective low-threshold pathway between
mindfulness and SCB. On the other hand, most often participants refer to changes in how they eat, which does not mean they change what they eat, i.e., they perceive more details when eating and enjoy their food more, but do not necessarily eat more sustainably. That mindful eating practices do not necessarily make people eat more sustainably is also shown by the adult data of the BiNKA project [72]. One explanation could be that the practice of mindful eating as well as mindfulness in general might encourage people to live more in the present moment and to accept and enjoy their present situation in life as it is. However, this could also bear the risk of narrowing perspectives and preventing participants from putting things they want to do into practice (e.g., changing their behavior towards more sustainability). People might even show less pro-social behavior because they are more self-oriented in the here and now as reflected in one single interview case. Future studies should explore this two-folded relationship between mindfulness and SC in greater depth.

The study presented is subject to some limitations. First, an 8-week long MBI is seemingly too short to change well-established behavioral patterns. Moreover, in our study, the originally intended daily meditation practice of 15 min at school or at home could not be realized as planned due to organizational (school) and motivational (students) constraints. Longer and continuous formats to build up and ensure a regular mindfulness practice should be implemented and investigated in future studies. Second, the participants were unaware of the consumption focus and their participation was not self-chosen. Samples that were not as saturated regarding SCB knowledge or target groups, which were actively seeking to change their consumption behavior, might have been affected in a different way if the consumption focus was made explicit already in the process of recruiting. Third, only two specific consumption areas (food and clothing) were investigated. Future research should also cover other consumption areas relevant for adolescents (e.g., electronic entertainment) or design more comprehensive programs (as an example, see the project of “Mindful Climate Action” by Barrett et al. [42]). Fourth, the results of the present study cannot be reliably attributed to the consumption-focused MBI having used a waitlist control group design. In future studies, MBIs without a consumption focus, such as a standardized MBSR training or other ESC formats, should be included as active control settings. Fifth, for future research with adolescents, quantitative measures for this target group should be further refined and adapted focusing on shortness. In addition to this, incentives for participation in the study should be considered to motivate the participants, especially if participation at school is mandatory. Lastly, as an exploratory pilot study, our sample was very small and not representative. Studying more diverse target groups with regard to age, type of school, cultural context, etc.,
might be fruitful to further substantiate the evidence base on the effects of mindfulness on SC among adolescents.

5. Conclusions

The present study aimed at investigating how mindfulness could possibly contribute to SCB in adolescents and ESC at school. Our study revealed the strong effects of the adapted MBI on pre-stages of SCB (awareness and reflection), whereas the effects on the intention to change behavior and actual consumption behavior were minor. Moreover, further effects not directly linked to, but potentially important for, a behavior change towards sustainability were detected (e.g., wellbeing, self-reflection, mindful eating, communication, and interaction). In conclusion, mindfulness seems to bear the potential to influence adolescents’ SCB on an indirect and individual level. However, the inconsistency between qualitative and quantitative results, as well as other methodological drawbacks and limitations of this pilot study, do not allow for drawing generalizable evidence.

Nevertheless, regarding ESC at school, combining mindfulness training with ESC formats appears to be a feasible and fruitful approach to engage adolescents with SC. Teaching ESC formats, discussing consumption-related topics in a mindfulness-based setting, and/or implementing mindfulness meditation into ESC curricula should, thus, be further pursued in educational research on SC. Future practice and research should seek to extend the time constraints of an eight-week course as used in this study, and explore how longer and more regular mindfulness practice in schools can fuel SCB. Moreover, consumption areas other than food and clothing, as well as different target groups, should be addressed to holistically assess the potential of mindfulness to build bridges towards a more sustainable future.
**Appendix A**

**Table A1. Correlations of pre-mean values of all measures.**

<table>
<thead>
<tr>
<th></th>
<th>SCB-f</th>
<th>SCB-c</th>
<th>SCA-f</th>
<th>MV</th>
<th>CC</th>
<th>WB</th>
<th>MA-int</th>
<th>MA-ext</th>
<th>MA-act</th>
<th>ME-emo</th>
<th>ME-cog</th>
<th>CP</th>
<th>CN</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCB-f</td>
<td>1</td>
<td>0.703</td>
<td>0.544</td>
<td>0.520</td>
<td>-0.507</td>
<td>-0.248</td>
<td>0.482</td>
<td>-0.026</td>
<td>0.031</td>
<td>0.107</td>
<td><strong>0.265</strong></td>
<td>*</td>
<td>0.354</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>SCB-c</td>
<td>1</td>
<td>0.504</td>
<td>**</td>
<td>0.617</td>
<td>-0.562</td>
<td>0.536</td>
<td>-0.245</td>
<td>0.371</td>
<td>0.490</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCA-f</td>
<td>1</td>
<td>0.685</td>
<td>-0.416</td>
<td>0.006</td>
<td>-0.058</td>
<td>0.136</td>
<td>0.418</td>
<td>-0.034</td>
<td>-0.106</td>
<td>0.128</td>
<td><strong>0.244</strong></td>
<td>*</td>
<td>**0.319</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>SCA-c</td>
<td>1</td>
<td>-0.449</td>
<td>0.018</td>
<td>-0.107</td>
<td>0.091</td>
<td>0.567</td>
<td>-0.153</td>
<td>-0.065</td>
<td>0.063</td>
<td>0.222</td>
<td></td>
<td>**0.513</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>MV</td>
<td>1</td>
<td>0.623</td>
<td>0.063</td>
<td>-0.075</td>
<td><strong>0.322</strong></td>
<td>-0.029</td>
<td>0.004</td>
<td>0.036</td>
<td>-0.182</td>
<td>-0.284</td>
<td></td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>CC</td>
<td>1</td>
<td>0.018</td>
<td>-0.002</td>
<td>-0.135</td>
<td>-0.120</td>
<td>0.018</td>
<td>0.083</td>
<td>-0.147</td>
<td>-0.069</td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>WB</td>
<td>1</td>
<td>0.178</td>
<td>-0.073</td>
<td>-0.011</td>
<td>-0.070</td>
<td>0.164</td>
<td>-0.135</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA-int</td>
<td>1</td>
<td>0.274</td>
<td>-0.192</td>
<td>-0.046</td>
<td>0.128</td>
<td><strong>0.268</strong></td>
<td>-0.003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MA-ext</td>
<td>MA-act</td>
<td>ME-emo</td>
<td>ME-cog</td>
<td>CP</td>
<td>CN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>----</td>
<td>----</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA-ext</td>
<td>1</td>
<td>-0.214</td>
<td>0.109</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA-act</td>
<td>-0.214</td>
<td>1</td>
<td></td>
<td>-0.054</td>
<td>-0.122</td>
<td>-0.207</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME-emo</td>
<td>0.109</td>
<td>-0.268</td>
<td>1</td>
<td>0.153</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME-cog</td>
<td></td>
<td>-0.054</td>
<td>-0.122</td>
<td>1</td>
<td>0.026</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. SCB = sustainable consumption behavior; SCA = sustainable consumption attitudes; f = food; c = clothing; MV = material values; CC = compensatory consumption; WB = wellbeing; MA-Int = mindfulness—awareness of internal experiences; MA-Ext = mindfulness—awareness of external experiences; MA-Act = mindfulness—acting with awareness. ME-emo = mindful eating—emotional; ME-cog = mindful eating—cognitive; CP = compassion; CN = connectedness to nature. ** p-value < 0.001. * p-value < 0.05.
References


