

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/318126372>

Mindfulness and Sustainable Consumption: A Systematic Literature Review of Research Approaches and Findings

Article in *Journal of Cleaner Production* · July 2017

DOI: 10.1016/j.jclepro.2017.06.007

CITATIONS

19

READS

1,604

5 authors, including:



Daniel Fischer

Arizona State University

129 PUBLICATIONS 577 CITATIONS

[SEE PROFILE](#)



Laura Stanzus

Technische Universität Berlin

6 PUBLICATIONS 34 CITATIONS

[SEE PROFILE](#)



Sonja Geiger

Technische Universität Berlin

31 PUBLICATIONS 278 CITATIONS

[SEE PROFILE](#)



Paul Grossman

Universitätsspital Basel (University Hospital Basel)

156 PUBLICATIONS 12,318 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



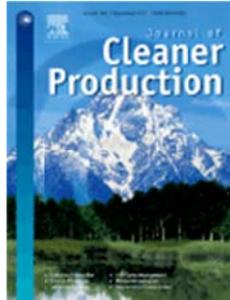
Processes of Sustainability Transformation [View project](#)



Living and working sustainably [View project](#)

Authors' post print version

Published as:



Fischer, D., Stanzus, L., Geiger, S., Grossman, P., & Schrader, U. (2017). Mindfulness and Sustainable Consumption: A Systematic Literature Review of Research Approaches and Findings. *Journal of Cleaner Production*. Advance online publication.

Published online: 03.07.2017

DOI: 10.1016/j.jclepro.2017.06.007

<http://www.sciencedirect.com/science/article/pii/S0959652617311769>

Mindfulness and Sustainable Consumption: A Systematic Literature Review of Research Approaches and Findings

Daniel Fischer^{1*}, Laura Stanzus², Sonja Geiger², Paul Grossman³, Ulf Schrader²

¹ Leuphana University of Lüneburg, Scharnhorststr. 1, 21335 Lüneburg, Germany

² Technische Universität Berlin, Marchstr. 23, 10587 Berlin, Germany

³ European Centre for Mindfulness (EZfA), Merzhauser Str. 173, 79100 Freiburg, Germany

* corresponding author (dfischer@leuphana.de)

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 interdisciplinary scientific community and societal decision-makers can draw.

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.

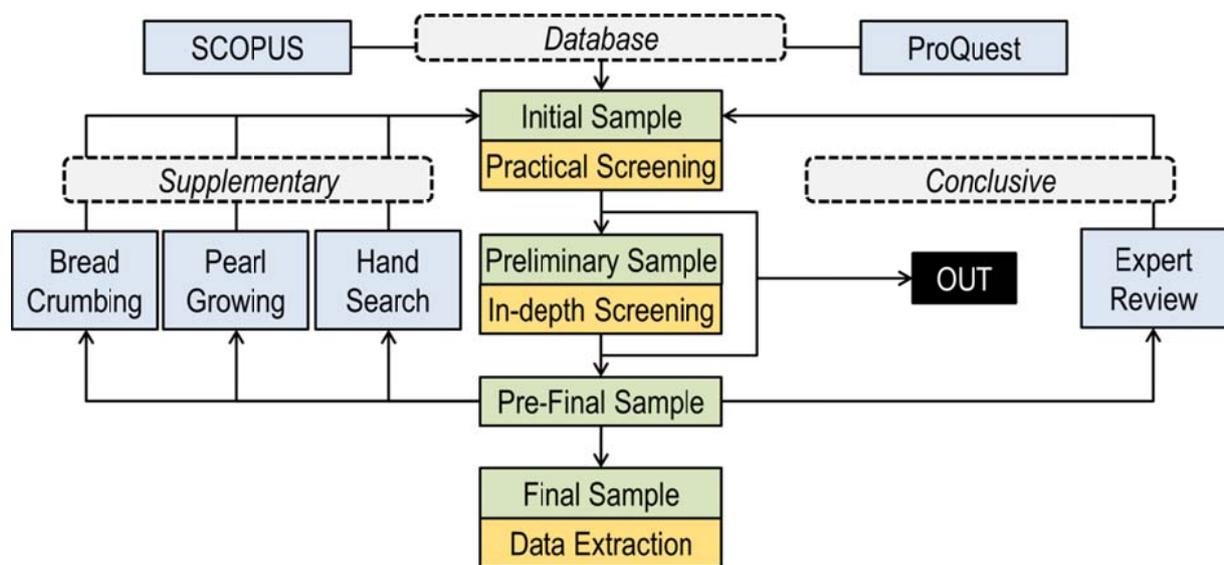


Figure 1. Sequential procedure used in SLR

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 deliberately 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 crumbing (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 crumbing, 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

Search Step	Source	Sample		
		Initial	Preliminary	Final
<i>Database</i>	SCOPUS	540	17	6
	ProQuest	339	3	1
<i>Supplementary</i>	Hand Search	2	2	0
	Bread Crumbing	14	1	0
	Pearl Growing	242	9	0
<i>Conclusive</i>	Expert Review	0	0	0
TOTAL		1137	32	7

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

Methodological Approaches	Empirical Findings
(1) What research questions are addressed?	Does mindfulness ...
(2) How is <i>mindfulness</i> understood and measured?	(1) ... disrupt routines?
(3) How is <i>sustainable consumption</i> understood and measured?	(2) ... promote more congruence with regard to the attitude-behavior gap?
(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

N ^o	Reference	Research Question	Sample (n)	Study design	Mindfulness		Sustainable consumption	
					Construct	Operationalization (item n)	Construct	Operationalization (item n)
1	Brown and Kasser, 2005	Can people live so as to promote both personal and planetary wellbeing? Can mindfulness explain this relationship?	General population (200) vs. simple lifestylers (200)	Correlational study (SEM with group comparison)	receptive attention and awareness	MAAS (15)	Ecologically Responsible Behavior	EFQ (12)+ ERB (54: Food , Consumption choices, Transport, Leisure time, Waste, Frugality)*
2	Amel et al., 2009	Is mindfulness toward internal and external stimuli positively correlated with sustainable behavior?	Eco fair visitors (500)	Correlational study (Regression)	self-regulating attention and observing sensations	FFMQ, 2 facets: AWA (8) and OBS (8)	Self-perceived greenness	Green scale (1) *
3a	Barbaro and Pickett, 2016	Does connectedness to nature indirectly affect the relationship between mindfulness and pro-environmental behavior?	Students (360)	Correlational study (Mediation)	unclear mix intentional awareness / behavioral regulation	FFMQ (39) All five facets	Pro-environmental behavior	short version of the PEB scale (17)
3b			General population (296)					
4	Jacob et al., 2009	Is there a significant relationship between mindfulness meditation and environmentally sustainable behavior (ESB)?	Buddhist Peace Fellow members (829)	Correlational study (Regression)	Process dimensions of Mindfulness meditation	(4): mind slowing down, stillness, ability to see thoughts without becoming attached to them, watch emotions without being carried away by them*	Environmentally Sustainable Behavior	Recycling, Household choices, Food (11)*
5	Brinkerhoff and Jacob, 1999	Do back-to-the-land experiences rather relate to mindfulness or church attendance?	Back to landers (565)	Correlational study (Regression)	Buddhist Mindfulness values	(7): Sense of wonder, union with nature, peace of mind, wholeness, joy, living in the present moment being accepted in the universe*	Back to the land values	High and Low tech consumption, Voluntary Simplicity (9)*
6a	Armstrong, 2012	Do associations exist between measured levels of mindfulness and measures connected to	General population and meditators	Correlational study	Holistic approach, based on Kabat-Zinn's definition	FFMQ (39) All five facets	a) Pro social and pro-environmental	a) Ethical and Environmental buying

		wellbeing, consumption, ecological concern, compulsive buying, and meditation?	(n=468)				behavior b) Compulsive buying	(6)* b) CBS Scale (11)
6b		What do individuals learning mindfulness experience and what do they notice regarding their consumption behavior?	University employees (n=9)	Intervention study (only post)				
6c		From such individuals [compulsive consumers], what can be concluded regarding the mechanisms by which mindfulness induces change?	Compulsive shoppers (n=12)	Intervention study (pre post)				

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

N ^o	Reference	Research Question	Sample (n)	Mindfulness construct	Sustainable consumption construct	Analytical approach	Data collection	Interpretations based on data
6b	Armstrong, 2012	What do individuals learning mindfulness experience, and what do they notice regarding their consumption behavior and in general?	University employees (n=12)	Holistic approach based on Kabat-Zinn's definition	Detailed conceptualization of varying perspectives – focus on pro-social, pro-environmental and lowering consumption	- Thematic analytic approach & Interpretative Phenomenological Analysis (IPA) - Pre-/post-design	Semi-structured interviews	Yes
6c		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?	Compulsive and "normal" shoppers (n=18)					
7	Essen and Mårtensson, 2014	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?	Organic food consumers (18-35 years) (n=10)	Concentration on mind-body awareness / sensitivity to nutrition related body sensations	Non specified use of the term "organic food consumers"	Descriptive phenomenological psychological method	Semi-structured interviews	Partly

(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 lifestyle, 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 ($\beta = 0.37$) 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

Nº	Disruption of routines	Congruence (with regard to the attitude-behavior gap)	Non-materialistic values and wellbeing	Pro-social behavior
1	-	-	Mindfulness and intrinsic values are seen as joint predictors for environmentally responsible behavior and subjective wellbeing	-
2	Mindfulness helps to consider behavioral option consciously	(discussed, but not measured)		-
3	-	-	Mindfulness increases connectedness to nature, this in turn enhances pro environmental behavior	-
4	-	-	Environmentally sustainable and mindfulness meditation seen as two related predictors of subjective wellbeing	-
5	-	-	Mindfulness is one expression of downshifting and simple back-to-the-land values	-
6a (quant)	Mindfulness disrupts compulsive consumption patterns	-	Mindfulness negatively related to material values and positively related to life satisfaction	-
6bc (qual)	Mindfulness leads to less compulsive consumption patterns	Greater likelihood to engage in behavior more in line with their attitudes	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	Rise in reported empathy and moral concern for others, beyond the close social circles of participants
7	-	Mindful eating broadened thought-action repertoire and stimulated embodiment	Increase in well-being as well as vitality and resilience	Rise in perceived self-compassion

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 ($\beta = 0.22$) 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 ($\beta = 0.19$ and $\beta = 0.30$) 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 ($\beta = 0.14 - 0.22$). The importance of feeling part of nature stood out here as the strongest predictor for mindfulness values ($\beta = 0.34$, 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.

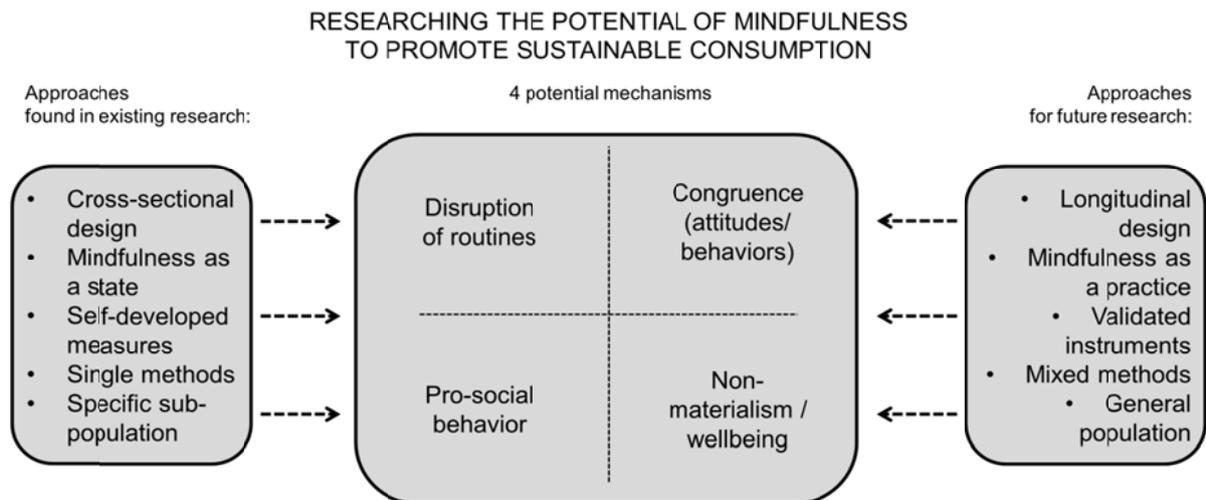


Figure 2. Recommendations for future research in SCR on mindfulness

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.

Acknowledgement

The present work is funded by the German Ministry for Education and Research (BMBF) in the project BiNKA (Education for Sustainable Consumption through Mindfulness Training)

under grants 01UT1416 and 01UT1416B. The authors would like to thank Laura Ditges, Angelika Haaser, Lena Kaupmann and Teresa Ruckelshauß for their support in data preparation and processing.

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

- Ajzen, I., 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50, 179–211.
- Amel, E.L., Manning, C.M., Scott, B.A., 2009. Mindfulness and Sustainable Behavior. *Pondering Attention and Awareness as Means for Increasing Green Behavior. Ecopsychology* 1, 14–25.
- Armstrong, A.J., 2012. Mindfulness and Consumerism: A Social Psychological Investigation. PhD Thesis, Surrey.
- Baer, R.A., Smith, G.T., Hopkins, J., Krietemeyer, J., Toney, L., 2006. Using self-report assessment methods to explore facets of mindfulness. *Assessment* 13, 27–45.
- Bahl, S., Milne, G.R., Ross, S.M., Mick, D.G., Grier, S.A., Chugani, S.K., Chan, S., Gould, S.J., Cho, Y.-N., Dorsey, J.D., Schindler, R.M., Murdock, M.R., Mariani, S.B., 2016. Mindfulness. The Transformative Potential for Consumer, Societal, and Environmental Well-Being. *Journal of Public Policy & Marketing* 35, 1–13.
- Barbaro, N., Pickett, S.M., 2016. Mindfully green. Examining the effect of connectedness to nature on the relationship between mindfulness and engagement in pro-environmental behavior. *Personality and Individual Differences* 93, 137–142.
- Barth, M., Rieckmann, M., 2016. State of the Art in Research on Higher Education for Sustainable Development, in Barth, M., Michelsen, G., Rieckmann, M., Thomas, I. (Eds.), *Routledge handbook of higher education for sustainable development*. Routledge, London, pp. 100–113.
- Bergman, M.M., 2010. On Concepts and Paradigms in Mixed Methods Research. *Journal of Mixed Methods Research* 4, 171–175.
- Bergomi, C., Tschacher, W., Kupper, Z., 2013. The Assessment of Mindfulness with Self-Report Measures: Existing Scales and Open Issues. *Mindfulness* 4, 191–202.
- Bergomi, C., Tschacher, W., Kupper, Z., 2014. Konstruktion und erste Validierung eines Fragebogens zur umfassenden Erfassung von Achtsamkeit (Construction and first validation of a questionnaire to comprehensively assess mindfulness). *Diagnostica* 60, 111–125.
- Birnie, K., Speca, M., Carlson, L.E., 2010. Exploring self-compassion and empathy in the context of mindfulness-based stress reduction (MBSR). *Stress and Health* 26, 359–371.
- Bishop, S.R., Lau, M., Shapiro, S., Carlson, L., Anderson, N.D., Carmody, J., Segal, Z.V., Abbey, S., Speca, M., Velting, D., Devins, G., 2004. Mindfulness. A Proposed Operational Definition. *Clinical Psychology: Science and Practice* 11, 230–241.
- Bolz, M., Singer, T. (Eds.), 2013. *Compassion. Bridging practice in Science*. Max Planck Society, Munich.
- Brake, A., 2010. Kombinieren, mixen, verbinden? Integration als konstitutives Element methodentriangulierender Zugänge [Combining, mixing, connecting? Integration as a constitutive element in approaches to methods triangulation], in: Ecarius, J., Mieth, I. (Eds.),

- Methodentriangulation in der qualitativen Bildungsforschung [methods triangulation in qualitative educational research]. Budrich, Barbara, Leverkusen, pp. 41–63.
- Brand, K.-W., 2010. Social Practices and Sustainable Consumption: Benefits and Limitations of a New Theoretical Approach, in: Gross, M., Heinrichs, H. (Eds.), *Environmental Sociology. European Perspectives and Interdisciplinary Challenges*. Springer, Berlin.
- Brinkerhoff, M.B., Jacob, J., 1999. Mindfulness and Quasi-Religious Meaning Systems: An Empirical Exploration within the Context of Ecological Sustainability and Deep Ecology. *Journal for the Scientific Study of Religion* 38, 524–542.
- Brown, K.W., Kasser, T., 2005. Are Psychological and Ecological Well-being Compatible? The Role of Values, Mindfulness, and Lifestyle. *Soc Indic Res* 74, 349–368.
- Brown, K.W., Ryan, R.M., 2003. The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology* 84, 822–848.
- Burroughs, J., Rindfleisch, A., 2002. Materialism and Well-Being: A Conflicting Values Perspective. *Journal of Consumer Research* 29, 348–370.
- Ceulemans, K., Molderez, I., van Liedekerke, L., 2015. Sustainability Reporting in Higher Education. A comprehensive review of the recent literature and paths for further research. *Journal of Cleaner Production* 106, 127–143.
- Chambers, R., Gullone, E., Allen, N.B., 2009. Mindful emotion regulation. An integrative review. *Clinical Psychology Review* 29, 560–572.
- Chatzisarantis, N.L.D., Hagger, M.S., 2007. Mindfulness and the Intention-Behavior Relationship Within the Theory of Planned Behavior. *Personality and Social Psychology Bulletin* 33, 663–676.
- Chiesa, A., 2013. The Difficulty of Defining Mindfulness: Current Thought and Critical Issues. *Mindfulness* 4, 255–268.
- Chiesa, A., Serretti, A., 2009. Mindfulness-Based Stress Reduction for Stress Management in Healthy People. A Review and Meta-Analysis. *The Journal of Alternative and Complementary Medicine* 15, 593–600.
- Condon, P., Desbordes, G., Miller, W.B., DeSteno, D., 2013. Meditation increases compassionate responses to suffering. *Psychological science* 24, 2125–2127.
- Crompton, T., Kasser, T., 2009. *Meeting Environmental Challenges: The Role of Human Identity*. WWF United Kingdom, Surrey.
- d'Astous, A., Maltais, J., Roberge, C., 1990. Compulsive Buying Tendencies of Adolescent Consumers. *Advances in Consumer Research* 17, 306–312.
- Dholakia, R., Wackernagel, M., 1999. *The ecological footprint questionnaire*, San Francisco.
- Di Giulio, A., Fischer, D., Schäfer, M., Blättel-Mink, B., 2014. Conceptualizing sustainable consumption: Toward an integrative framework. *Sustainability: Science, Practice, & Policy* 10, 45–61.
- Dong, W., Brunel, F.F., 2006. The Role of Mindfulness in Consumer Behavior. *Advances in Consumer Research* 33, 276–278.
- Ericson, T., Kjørstad, B.G., Barstad, A., 2014. Mindfulness and sustainability. *Ecological Economics* 104, 73–79.
- Essen, E. von, Mårtensson, F., 2014. Young adults' use of food as a self-therapeutic intervention. *International journal of qualitative studies on health and well-being* 9, 23000.
- Fink, A., 2009. *Conducting research literature reviews. From the Internet to paper*, 3rd ed. Sage Publications, Thousand Oaks, Calif u.a.
- Fischer, A., Hanley, N., 2007. Analysing decision behaviour in stated preference surveys: A consumer psychological approach. *Ecological Economics* 61, 303–314.
- Geiger, S., Fischer, D., Schrader, U., 2017. Measuring what matters in sustainable consumption research: an integrative framework for the selection of relevant behaviors. *Sustainable Development* (online first), doi: 10.1002/sd.1688.
- Giddens, A., 2008. *The constitution of society. Outline of the theory of structuration*. Polity Press, Cambridge.
- Groot, J.I.M. de, Steg, L., 2008. Value Orientations to Explain Beliefs Related to Environmental Significant Behavior: How to Measure Egoistic, Altruistic, and Biospheric Value Orientations. *Environment and Behavior* 40, 330–354.
- Grossman, P., 2008. On measuring mindfulness in psychosomatic and psychological research. *Journal of psychosomatic research* 64, 405–408.

- Grossman, P., 2010. Mindfulness for Psychologists: Paying Kind Attention to the Perceptible. *Mindfulness* 1, 87–97.
- Grossman, P., 2011. Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's (re)invention of mindfulness. Comment on Brown et al. (2011). *Psychological Assessment* 23, 1034–1040.
- Grossman, P., 2013. Kindness and compassion as integral to mindfulness, in: Bolz, M., Singer, T. (Eds.), *Compassion. Bridging practice in Science*. Max Planck Society, Munich, pp. 192–207.
- Grossman, P., 2015. Mindfulness. Awareness Informed by an Embodied Ethic. *Mindfulness* 6, 17–22.
- Grossman, P., Niemann, L., Schmidt, S., Walach, H., 2004. Mindfulness-based stress reduction and health benefits. *Journal of psychosomatic research* 57, 35–43.
- Grossman, P., van Dam, N.T., 2011. Mindfulness, by any other name... Trials and tribulations of sati in western psychology and science. *Contemporary Buddhism* 12, 219–239.
- Haanpää, L., 2007. Structures and mechanisms in sustainable consumption research. *International Journal of Environment and Sustainable Development* 6, 53–66.
- Hanh, T.N., 1995. *Living Buddha, living Christ*. Riverhead Books, New York.
- Heiskanen, E., Mont, O., Power, K., 2014. A Map Is Not a Territory—Making Research More Helpful for Sustainable Consumption Policy. *J Consum Policy* 37, 27–44.
- Henkel, A., Andersen, N.Å., 2015. Introduction. The necessity of a new understanding of responsibility for modern society. *Soziale Systeme* 19, 221–232.
- Howell, R.A., 2013. It's not (just) “the environment, stupid!” Values, motivations, and routes to engagement of people adopting lower-carbon lifestyles. *Global Environmental Change* 23, 281–290.
- Hwang, Y.-S., Kearney, P., 2014. Mindful and Mutual Care for Individuals with Developmental Disabilities. A Systematic Literature Review. *Journal of Child and Family Studies* 23, 497–509.
- Hyland, T., 2011. *Mindfulness and learning. Celebrating the affective dimension of education*. Springer, Dordrecht, New York.
- Ivanova, D., Stadler, K., Steen-Olsen, K., Wood, R., Vita, G., Tukker, A., Hertwich, E.G., 2015. Environmental Impact Assessment of Household Consumption. *Journal of Industrial Ecology* 20, 526–536.
- Jacob, J., Jovic, E., Brinkerhoff, M.B., 2009. Personal and Planetary Well-being. Mindfulness Meditation, Pro-environmental Behavior and Personal Quality of Life in a Survey from the Social Justice and Ecological Sustainability Movement. *Soc Indic Res* 93, 275–294.
- Johnson, R.B., Onwuegbuzie, A.J., Turner, L.A., 2007. Toward a Definition of Mixed Methods Research. *Journal of Mixed Methods Research* 1, 112–133.
- Kabat-Zinn, J., 1982. An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation. Theoretical considerations and preliminary results. *General Hospital Psychiatry* 4, 33–47.
- Kabat-Zinn, J., 2003. Mindfulness-Based Interventions in Context. Past, Present, and Future. *Clinical Psychology: Science and Practice* 10, 144–156.
- Kabat-Zinn, J., Massion, A.O., Kristeller, J., Peterson, L.G., Kenneth, F.E., Pbert, L., Lenderking, W.R., Santorelli, S.F., 1992. Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry* 149, 936–943.
- Kaiser, F.G., Wilson, M., 2004. Goal-directed conservation behavior: the specific composition of a general performance. *Personality and Individual Differences* 36, 1531–1544.
- Kasser, T., Rosenblum, K.L., Sameroff, A.J., Deci, E.L., Niemiec, C.P., Ryan, R.M., Árnadóttir, O., Bond, R., Dittmar, H., Dungan, N., Hawks, S., 2014. Changes in materialism, changes in psychological well-being. Evidence from three longitudinal studies and an intervention experiment. *Motiv Emot* 38, 1–22.
- Kaufmann-Hayoz, R., Brohmann, B., Defila, R., Di Giulio, A., Dunkelberg, E., Erdmann, L., Fuchs, D.A., Götz, S., Homburg, A., Matthies, E., Nachreiner, M., Tews, K., Weiß, J., 2012. Societal steering of consumption towards sustainability, in: Defila, R., Di Giulio, A., Kaufmann-Hayoz, R. (Eds.), *The Nature of Sustainable Consumption and How to Achieve it. Results from the Focal Topic "From Knowledge to Action – New Paths towards Sustainable Consumption"*. Oekom, München, pp. 113–142.
- Kenis, A., Mathijs, E., 2012. Beyond individual behaviour change: the role of power, knowledge and strategy in tackling climate change. *Environmental Education Research* 18, 45–65.

- Kollmuss, A., Agyeman, J., 2002. Mind the Gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research* 8, 239–260.
- Langer, E.J., Moldoveanu, M., 2000. The Construct of Mindfulness. *Journal of Social Issues* 56, 1–9.
- Leiberg, S., Klimecki, O., Singer, T., 2011. Short-term compassion training increases prosocial behavior in a newly developed prosocial game. *PloS one* 6, e17798.
- Lim, D., Condon, P., DeSteno, D., 2015. Mindfulness and compassion: an examination of mechanism and scalability. *PloS one* 10, e0118221.
- Lorek, S., Vergragt, P.J., 2015. Sustainable consumption as a systemic challenge: inter- and transdisciplinary research and research questions, in: Reisch, L.A., Thøgersen, J. (Eds.), *Handbook of research on sustainable consumption*. Edward Elgar Publishing, Cheltenham, UK, pp. 19–32.
- Pepper, M., Jackson, T., Uzzell, D., 2009. An examination of the values that motivate socially conscious and frugal consumer behaviours. *Int J Cons Stud* 33, 126–136.
- Pfattheicher, S., Sassenrath, C., Schindler, S., 2016. Feelings for the Suffering of Others and the Environment. *Compassion Fosters Proenvironmental Tendencies*. *Environment and Behavior* 48, 929–945.
- Pollock, C.L., Smith, S.D., Knowles, E.S., Bruce, H.J., 1998. Mindfulness limits compliance with the that's-not-all technique. *Personality and Social Psychology Bulletin* 24, 1153–1157.
- Power, K., Mont, O., 2010. The Role of Formal and Informal Forces in Shaping Consumption and Implications for Sustainable Society: Part II. *Sustainability* 2, 2573–2592.
- Reichardt, C.S., 2009. Quasi-Experimental Design, in: Millsap, R.E., Maydeu-Olivares, A. (Eds.), *The Sage handbook of quantitative methods in psychology*. SAGE, Thousand Oaks, Calif., pp. 46–71.
- Reisch, L.A., Thøgersen, J. (Eds.), 2015. *Handbook of research on sustainable consumption*. Edward Elgar Publishing, Cheltenham, UK.
- Richins, M.L., Dawson, S., 1992. A Consumer Values Orientation for Materialism and Its Measurement. *Scale Development and Validation*. *J CONSUM RES* 19, 303.
- Ridley, D., 2012. *The literature review. A step-by-step guide for students*, 2nd ed. SAGE, London.
- Rosenberg, E.L., 2005. Mindfulness and consumerism, in: Kasser, T., Kanner, A.D. (Eds.), *Psychology and consumer culture. The struggle for a good life in a materialistic world*. American Psychological Assoc, Washington, DC, pp. 107–125.
- Schäfer, M., Jaeger-Erben, M., Bamberg, S., 2012. Life Events as Windows of Opportunity for Changing Towards Sustainable Consumption Patterns? *J Consum Policy* 35, 65–84.
- Shapiro, S.L., Schwartz, G.E., Bonner, G., 1998. Effects of Mindfulness-Based Stress Reduction on Medical and Premedical Students. *Journal of Behavioral Medicine* 21, 581–599.
- Shove, E., 2003. *Comfort, cleanliness and convenience. The social organization of normality*. Berg, Oxford, England, New York.
- Souza, I.C.W. de, Barros, V.V. de, Gomide, H.P., Miranda, T.C.M., Menezes, V.d.P., Kozasa, E.H., Noto, A.R., 2015. Mindfulness-based interventions for the treatment of smoking: a systematic literature review. *Journal of alternative and complementary medicine* 21, 129–140.
- Spaargaren, G., 2003. Sustainable consumption: A theoretical and environmental policy perspective. *Society & Natural Resources* 16, 687–701.
- Steg, L., Perlaviciute, G., van der Werff, E., Lurvink, J., 2014. The Significance of Hedonic Values for Environmentally Relevant Attitudes, Preferences, and Actions. *Environment and Behavior* 46, 163–192.
- Tukker, A., Cohen, M.J., Hubacek, K., Mont, O., 2010. The Impacts of Household Consumption and Options for Change. *Journal of Industrial Ecology* 14, 13–30.
- Tukker, A., Cohen, M.J., Zoysa, U. de, Hertwich, E., Hofstetter, P., Inaba, A., Lorek, S., Sto, E., 2006. The Oslo Declaration on Sustainable Consumption. *Journal of Industrial Ecology* 10, 9–14.
- Watson, D., Acosta Fernández, J., Wittmer, D., Gravgård Pedersen, O., 2013. Environmental pressures from European consumption and production. A study in integrated environmental and economic analysis. Publications Office, Luxembourg.
- Whitmarsh, L., O'Neill, S., 2010. Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology* 30, 305–314.