



HAL
open science

Mindfulness and green purchase intention: A mediated moderation model uncovering the role of ethical self-identity

Carole Daniel, Elodie Gentina, Tavleen Kaur

► To cite this version:

Carole Daniel, Elodie Gentina, Tavleen Kaur. Mindfulness and green purchase intention: A mediated moderation model uncovering the role of ethical self-identity. *Ecological Economics*, 2023, 209, pp.107810. <10.1016/j.ecolecon.2023.107810>. <hal-04132535>

HAL Id: hal-04132535

<https://hal.science/hal-04132535v1>

Submitted on 31 Mar 2025

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons CC BY-NC 4.0 - Attribution - Non-commercial use - International License

Title

**MINDFULNESS AND GREEN PURCHASE INTENTION:
A MEDIATED MODERATION MODEL UNCOVERING THE ROLE OF ETHICAL
SELF-IDENTITY**

Carole Daniel

SKEMA. Business School. Université Côte d'Azur. France. Avenue Willy Brandt, 59777
Euralille
Email: carole.daniel@skema.edu
Tel: 00 33 (0)6 37 21 48 05

Elodie Gentina

IESEG School of Management, Univ. Lille, CNRS, UMR 9221 - LEM - Lille
Economie Management, F-59000 Lille, France
Email: e.gentina@ieseg.fr
Tel: 00 33 (0)6 78 74 47 68

Tavleen Kaur

Independent Researcher, PhD from College of Business, Chungbuk National University,
1 Chungdae-Ro, Seowon-Gu, Cheongju 28644, South Korea.
Email: tavleendhandra@gmail.com

Paper Submitted to
Ecological Environment

Conflict of interest

The authors declare no conflict of interest.

**MINDFULNESS AND GREEN PURCHASE INTENTIONS:
A MEDIATED MODERATION MODEL UNVEILING THE ROLE OF ETHICAL
SELF-IDENTITY**

Abstract

Ecological economists seek alternatives to capitalism that might establish societies that prioritize respect for the planet. Building on recent conceptual works, the current research adopts a self-determination perspective on human motivation to propose a mediated moderation model in which mindfulness affects green purchase intentions (GPI). Specifically, a self-ethical identity might mediate the relationship between dispositional mindfulness and GPI, and mindfulness training should enhance this effect. The test of the proposed model, with 778 members of the general population in France, affirms the hypothesized relationships, including a positive relation between trait mindfulness and GPI that is significantly mediated by self-ethical identity. Attending mindfulness training also has a moderating effect on this mediated relationship. The current study accordingly contributes to ongoing research designed to understand the potential benefits of mindfulness for resolving sustainability challenges.

Keywords: mindfulness, green purchase intentions, ethical self-identity, mindfulness training

**MINDFULNESS AND GREEN PURCHASE INTENTIONS:
A MEDIATED MODERATION MODEL UNVEILING THE ROLE OF ETHICAL
SELF-IDENTITY**

1. Introduction

Humankind faces vast and global environmental challenges, including climate change, depleted natural resources, and threats to biodiversity (Harris, 2004). Both international and interdisciplinary efforts are required to revise consumption patterns, such that they are no longer a threat to the planet. In the past decade, consumers' sensitivity to environmental issues has prompted significant research attention (e.g., Menger and Hamm, 2021; Sama et al. 2018). To transition toward a sustainable society, change strategies must be implemented in three different spheres: personal, political, and practical (O'Brien, 2018). The potential effects of the personal sphere on societal transformation have gained particular momentum among ecological economists, who recognize the powerful influence of worldviews, values, and ethical principles for facilitating agent-driven cultural change (Bina and Vaz, 2011). In line with self-determination theory that highlights the key role of intrinsic motivation in human behavior (Deci and Ryan, 2013), ecological economists also argue that human beings represent transitioning forces, rather than passive recipients, of environmental policies, such that intrinsically motivated pro-environmental behaviors (PEB) are more effective and long lasting than extrinsically motivated ones (Thiermann and Sheate, 2020).

Acknowledging the need for a fundamental shift in consciousness to ensure ecological sustainability (Dhiman and Marques, 2016; Parodi and Tamm, 2018), we require a better understanding of innate, individual motivations to be able to promote change at the personal level, which has prompted wider consideration of mindfulness among sustainable consumption researchers. Mindfulness, defined as receptive attention to and awareness of present events and experience (Brown et al. 2007), offers a promising counterpoint to

consumerism (Burch, 2000; Rosenberg, 2004). The quality of conscious awareness that is signaled by mindfulness may prompt consideration of the environmental consequences of consumption decisions and encourage resistance to consumerist messages that promote materialistic goals (Brown and Kasser, 2005). Mindfulness is associated with value clarification, empathy, and compassion, such that it may influence beliefs and actions conducive to the transition toward sustainability (Carroll, 2016; Scharmer, 2009; Wamsler et al., 2018). Despite growing evidence of mindfulness's contributions to overcoming environmental challenges, to attain both sustainable consumption and personal well-being (Dhandra, 2019; Ericson et al., 2014; Hüttel et al., 2020), the mechanisms linking mindfulness to sustainable consumption remain largely unknown (Wamsler, 2018; Wamsler and Brink, 2018).

We seek to explore such mechanisms in the context of green consumption. Consumers' perceptions of themselves as "green" influences their intentions to engage in green consumption behaviors, and an ethical self-identity (i.e., extent to which people perceive themselves as worried about ethical issues; Singh, 2016) is among the strongest predictors of green purchase intentions (GPI) (Arli et al., 2018). Therefore, finding ways to reinforce ethical self-identities represents a relevant effort. We propose a mediated moderation model, which highlights how mindfulness can enhance GPI, both directly and indirectly through increased ethical self-identity. We use structural equation modeling among a sample of 778 French individuals. In addition, in response to calls to explore effective therapies at individual level aiming at building a sustainable future (Costanza, 2020) and methods for reinforcing the benefits of ethical self-identity for GPI (Arli et al., 2018), we investigate the extent to which mindfulness training might augment the effects of trait mindfulness.

2. Literature review and theoretical framework

2.1. Mindfulness and GPI

Mindfulness emanates from Buddhism, a philosophy based on the principles of wisdom, virtue, and meditation. Buddhism and related worldviews offer relevant responses to the impending challenges of sustainability, due to their non-anthropocentric conceptualization of humanity's place in the ecosphere and their prioritization of developing mindful capabilities (Daniels, 2010; Mabsout, 2015). The quality of consciousness that characterizes mindfulness encourages reflection on the ecological impact of behaviors (Brown and Kasser, 2005), such that people pay more attention to their purchasing decisions, including being careful to purchase products that prevent harmful consequences for the self, community, and nature (Rosenberg, 2004). By facilitating people's focus on specific experiences, which might entail their feelings and thoughts about the natural world (Bishop et al., 2004), mindfulness counters automatic decision processing (Bargh and Chartrand, 1999). Mindful people establish stronger sensory connections with the world, which increases their awareness of available sustainable options (Brown and Kasser, 2005) and intentions to adopt them. That is, mindfulness enables consumers to make choices with diligent care (Brown and Ryan, 2003). Table 1 illustrates research works that have associated mindfulness with sustainability.

Table 1. Overview of research linking mindfulness to sustainability

Authors	Study Region	Subject of study	Method of investigation	Key findings
Amel et al., 2009	Midwest, United States	Mindfulness for increasing green behavior	Cross sectional study	Acting with awareness is significantly positively related with self-reported sustainable behavior
Bahl et al., 2016	N/A	Mindfulness as an antidote to mindless consumption	Conceptual paper	Mindfulness has a transformative potential for consumer, societal and environmental well-being
Barber and Deale, 2014	United States	Mindfulness to support hotels' stewardship of the environment	Cross sectional study	Hotel guests' mindfulness make them aware of and responsive to hotels' sustainability practices
Barbaro and Pickett, 2016	Midwest, United States	Effect of connectedness to nature on the relationship between mindfulness and PEB	Cross sectional study	Mindfulness is significantly positively related to PEB directly, and connectedness to nature partially mediates this relationship
Bernal et al., 2018	UK	Building sustainability on deep values through mindfulness nurturing	Case study	Mindfulness nurturing in business context contributes to promote shared values and cultural change to align sustainability goals with organizational performance
Brown and Kasser, 2005	Midwest, United States	Compatibility of psychological and ecological well-being: the role of values, mindfulness and lifestyle	Cross sectional study	Higher dispositional mindfulness relates to higher subjective well-being (SWB) and ecologically responsible behavior (ERB), and mindfulness explains the compatibility of SWB and ERB
Chan, 2001	China (Beijing and Guangzhou)	How cultural and psychological factors influence green purchase behavior	Cross sectional study	Man-nature orientation and collectivism are significantly and positively related to consumers' attitudes toward green purchases, which in turn affects green purchase intention and ultimately green purchase behavior.
Daniels, 2010	N/A	Buddhism can help shape alternative paradigmatic basis for sustainable economies	Conceptual paper	Buddhist world view, together with beliefs and values and human happiness feed into appropriate responses to the challenges of climate change
Dhandra,	India	Mindfulness and	Cross-	Mindfulness is positively related to green purchase intention,

2019		sustainable consumption	sectional study	social conscious purchasing and frugal purchasing behavior and negatively related to materialism. Green purchase intention, social conscious purchasing and materialism showed a relationship with life satisfaction and significantly mediate the relationship between mindfulness and satisfaction with life
Dharmesti et al., 2020	Australia	Green mindfulness and hotel guests PEB	Cross-sectional study	Green mindfulness is the dominant predictor of hotel guests' PEB
Ericson et al., 2014	N/A	Mindfulness and sustainability	Conceptual paper	Promoting mindfulness in schools and at work would contribute to more sustainable ways of life and greater well-being
Fischer et al., 2017	N/A	Mindfulness and sustainable consumption	Literature review	Four potential mechanisms relate mindfulness to sustainable consumption: disrupt routine, promote congruence to the attitude-behavior gap, nurture non-materialistic values, enhance well-being and foster pro-social behavior.
Geiger et al. 2020	Germany	Sustainability based mindfulness intervention and sustainable consumption behaviors	Longitudinal Study	Sustainability based mindfulness intervention (sMBI) had no direct effects on sustainable consumption behavior but had a successful effect on mindful experiences. sMBI improved wellbeing and decreased materialistic value orientations. Results suggest that the sMBI influences behavior-distal factors which may ultimately have an impact on sustainable or consumption behavior over time.
Kaur and Luchs, 2022	India and United States	Mindfulness, Value orientations and sustainable behavior	Cross-sectional study	Mindfulness has a positive relationship with biospheric and altruistic values and these values mediate the relationship between mindfulness and sustainable consumption behavior
Lim et al., 2015	Northeast, United States	Mindfulness and compassion	Experiment	Mindfulness meditation increases compassionate responding but not empathic accuracy
Mabsout, 2015	N/A	Mindful capability	Conceptual paper	Mindful capability combining the Buddhist philosophy of non-self and a decentering of humanity's place in the ecosphere is proposed as the capability that would benefit sustainable development.
Rosenberg, 2004	N/A	Mindfulness as an antidote to consumerism	Conceptual paper	Much modern consumer behavior consist of automatic and unexamined actions. Mindfulness would enhance awareness of

				cognitive-behavioral processes underlying relatively automatic consumption, and remedy the need for fulfillment that is endemic in modern society
Thiermann and Sheate, 2020	N/A	Experiential strategies for pro-environmental behavior	Conceptual paper	Experiential strategies are proposed as new environmental interventions, and theoretical insights – mostly rooted in self-determination theory - are provided to link mindfulness and sustainable lifestyles. The role of self-identity is highlighted
Wamsler and Brink, 2018	Sweden	Mindfulness and sustainable climate adaptation	Cross-sectional study	Individual mindfulness is significantly and positively related with motivation to take climate adaptation actions or to support them, especially actions that are ‘other-focused’ or support pro-environmental behavior. Mindfulness may also corroborate the acknowledgement of climate change and associated risk perception

Growing research demonstrates specifically how mindfulness influences sustainable consumption (Fisher et al., 2017). Amel et al. (2009) reveal that when mindful people make purchase decisions, they are more likely to check labels for elements related to environmental protection, such as phosphates, and choose products with minimal or reusable packaging. Mindful hotel guests also exhibit greater water-saving, energy-saving, and recycling behaviors (Dharmesti et al., 2020). Barber and Deale (2014) postulate that mindful people seek goods and services that are less harmful to the environment and express greater concern for other people and society. Further studies demonstrate specifically that mindfulness promotes PEB (Barbaro and Pickett, 2016) and socially and environmentally responsible consumption (Li et al., 2020). That is, Brown and Kasser (2005) show that mindfulness promotes green behavior and that people with greater mindfulness are happy and live in more ecologically responsible ways. Green consumption, a form of consumption that is adapted to “green growth” economic models (Lorek and Spangenberg, 2014), aims to reconcile economic growth with sustainability by increasing eco-efficiency (Akenji, 2014), through purchases of environmentally friendly products and avoidance of products that harm the environment (Chan, 2001). With regard to PEB, we thus consider intentions to buy green products, which signal motivational factors that prompt consumers to engage in actual green purchase behaviors (Pagiaslis and Krontalis, 2014; Ramayah et al., 2010).

2.2. Ethical self-identity as a mediator

Fischer et al. (2017) identified four mechanisms underlying the enhancing effect of mindfulness on sustainable consumption. They are linked to mindfulness ability to (1) disrupt routines, such as unconscious, unsustainable consumption choices (Bahl et al., 2016; Rosenberg, 2004); (2) reduce the attitude–behavior gap by challenging inattention to experiences that widens this gap (Ericson et al. 2014; Rosenberg, 2004); (3) nurture non-materialistic values and well-being by cultivating openness, generosity, kindness, and mental

clarity (Burroughs and Rindfleisch, 2002; Kasser et al., 2014; Richins and Dawson, 1992); and (4) foster pro-social behaviors (Leiberg et al., 2011; Lim et al., 2015).

We propose that mindfulness influences sustainable consumption through enhanced ethical self-identity, then anticipate a motivational process through which self-identity affects individual GPI. Identity is a central concept in economic models of behavior, due to its explanatory power for predicting economic outcomes such as consumption (Akerlof and Kranton, 2000). Research supports the inclusion of self-identity in the theory of planned behavior, as an additional predictor of intentions to behave in particular ways, particularly in contexts in which behaviors are not purely self-interested but also feature ethical considerations (Sparks and Shepherd, 1992). In such contexts, decision-making may be driven by an ethical self-identity (Shaw and Shiu, 2002), such that ethical consumers make ethical consumption choices because ethical considerations are critical to their self-identity. People can choose their identity, and in a sense, the “choice of identity may be the most important ‘economic’ decision people make. Individuals may—more or less consciously—choose who they want to be” (Akerlof and Kranton, 2000, p. 717). In a study of how consumers avoid purchasing clothing made in sweatshops, Shaw et al. (2006) identify a significant contribution of self-identity on different motivational constructs. If a motivated behavior is evaluated as acceptable according to the person’s self-concept, it becomes evidence of the individual’s will, such that “Volition transforms behaviour into personalized action. As a result, it profoundly affects the dynamic impact of a motive, since the deeper layers of personality dynamics are added to the subject’s motivation for a specific goal-object” (Nuttin, 1987, pp. 317–18).

Noting the observed relationship between mindfulness practices and experiences of the self (Berkovich-Ohana et al., 2012, 2014; Farb et al., 2007), people naturally disposed to mindfulness might be more likely to exhibit characteristic patterns of beliefs about the self.

Among the few studies of mindfulness in relation to identity development, we find some initial evidence of its associations with greater self-concept clarity (Hanley and Garland, 2017). Mindfulness relates to greater identity clarity, likely because having a present focus and being open foster knowledge about one's own thoughts, feelings, and behaviors, by reducing informational and motivational barriers to understanding oneself (Carlson, 2013). Thus, people disposed to mindfulness should evince greater familiarity with and knowledge about their selves. Furthermore, mindfulness requires ethical foundations (Verhaeghen, 2015), without which it may lead to unwholesome behavior (Monteiro et al., 2015). Mindfulness denotes a moral conscience and discernment between right and wrong, which supports self-regulation (Krägeloh, 2016). Finally, mindfulness studies indicate links with greater moral intent and fewer ethical breaches (e.g., Ruedy and Schweitzer, 2010).

Because people with greater mindfulness are more aware of their present thoughts, emotions, and responses, they also should be more conscious of acting on their beliefs and addressing their own ethical concerns when making consumption decisions (Sheth et al., 2011). Individual identity or self-identity concepts in sustainable consumption literature offer good predictions of intentions, PEB (Gatersleben et al., 2019; Johe and Bhullar, 2016; Melo et al., 2018; Whitmarsh and O'Neil, 2010), and green consumer behavior (Sparks and Shepherd, 1992; Stets and Biga, 2003). Previous studies predict that people who perceive themselves as green consumers engage in PEB, as a means of self-identity expression (Oliver and Lee, 2010; Shaw and Shiu, 2003). As Trudel et al. (2016) demonstrate, when everyday products (e.g., paper, cups) are linked to individual identity, they are less likely to be trashed and more likely to be recycled. They argue that placing identity-related products in the trash symbolizes trashing a part of the self. Ethical self-identity also has a positive effect on moral obligations, in contexts involving opting for renewable energy (Van der Werff et al., 2013), purchasing ethical food products (Shaw and Shiu, 2003) or adopting electric cars (Barbarossa

et al., 2017). Overall then, the more people view themselves as ethical consumers, the more likely they are to sense a moral obligation to perform or refrain from ethical or unethical acts, including opting for green alternatives. People with stronger ethical self-identities are more conscious of the effects of their decisions on the environment and society as a whole (Peluso, 2015).

2.3. Moderating role of mindfulness training

Self-determination theorists suggest environmental interventions might enhance individual self-determination and inner motivations (Green-Demers et al., 1997; Pelletier et al., 2011). Such experiential interventions aim to physically, cognitively, and affectively stimulate meaningful experiences related to the self, others, and nature; they represent experiential strategies for behavioral change (Thiermann and Sheate, 2020). Together with nature exposure, mindfulness interventions have deep transformative effects on the inner self (Wamsler, 2019). Mindfulness should enhance self-determination, because its practice is associated with autonomous regulation and greater vitality (Ryan and Deci, 2008). Shapiro et al. (2012) also find that mindfulness training enhances moral reasoning. Yet scarce empirical research exists with regard to the effect of mindfulness interventions on PEB. Commitment to regular mindfulness practices appears positively related to ecologically sustainable behavior (Jacob et al., 2009; Panno et al., 2018), but the effects of mindfulness-based interventions on PEB remain unclear, especially in the face of some contradictory findings. For example, a short mindfulness intervention increased beliefs in climate change (Wang et al. 2019), and a four-week online mindfulness intervention enhanced connectedness to nature and PEB (Ray et al. 2020). But a longer, two-month, sustainability-linked, mindfulness-based intervention led to greater well-being and lower materialistic value orientations, not to sustainable consumption (Geiger et al. 2020).

The scarcity of empirical mindfulness intervention studies related to PEB and the divergent findings thus emphasize the need for further investigations. Grounding our reasoning in self-determination theory and predictions that mindfulness interventions can serve as experiential strategies that stimulate meaningful experiences in relation to the self, others, and nature (Thiermann and Sheate, 2020), we suggest a moderating effect of rigorous, extended (two-month) mindfulness training. To test this prediction, we compare a group of participants who were trained to practice mindfulness through a Mindfulness-Based Stress Reduction (MBSR) program (Kabat-Zinn, 1982) against a group without such training. The MBSR program is a commonly tested method in management literature (Chaskalson and Hadley, 2015). It typically consists of weekly group sessions and daily individual mindfulness practice spread over a two-month period, which ends with a one-day silent retreat. In this context, and in line with our arguments, we test the following hypotheses:

H1: Trait mindfulness relates directly and positively to green purchase intentions.

H2: Trait mindfulness relates positively to ethical self-identity.

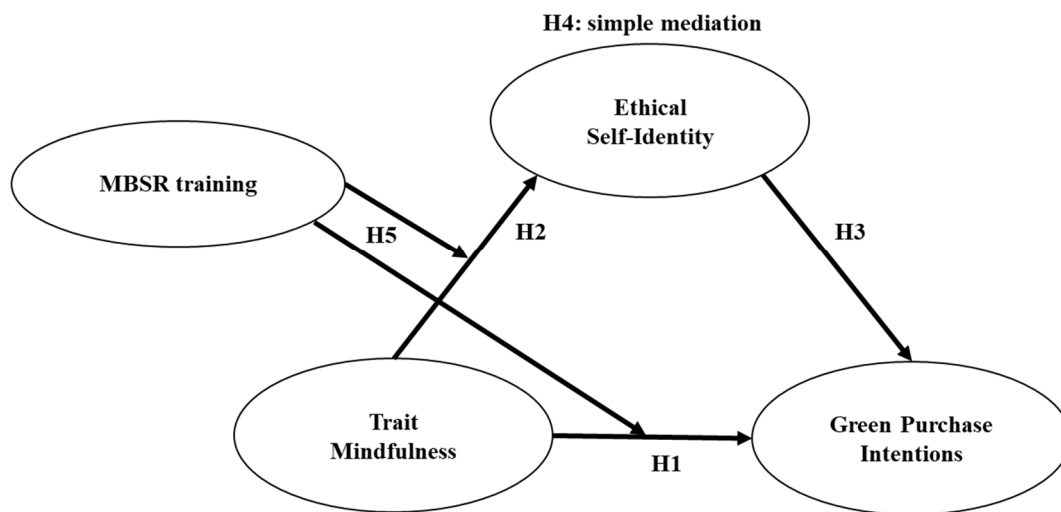
H3: Ethical self-identity relates positively to green purchase intentions.

H4: Ethical self-identity mediates the relationship between trait mindfulness and green purchase intentions.

H5: Mindfulness training moderates the mediated relationship, such that the indirect relationship (trait mindfulness → ethical self-identity → green purchase intentions) is stronger among people who receive mindfulness training than for those without such training.

Figure 1 summarizes the hypothesized effects.

Figure 1: Conceptual model



3. Methods

3.1. Research Design

In order to test our proposed conceptual model, we conducted an empirical study in the Lille Metropolitan area, the fourth-largest urban area in France with more than 1.1 million inhabitants North Paris. The data was collected using purposive sampling via an online questionnaire for completion through a Qualtrics platform. Participants anonymously completed the survey questionnaire, participated voluntarily, and did not receive any incentives or compensation. The data collection took place over five months (August–December 2020). We recruited participants in two key ways.

MBSR group. In order to recruit participants with prior mindfulness training and who recently had completed a MBSR program, five instructors based in France, certified by the Center for Mindfulness at the University of Massachusetts (U.S.) were contacted. All five certified instructors agreed to send the questionnaire by email to adult participants in their MBSR programs in the previous two years. A total of 471 respondents (59% women, 77% married, average age 42 years) volunteered to participate in the study.

Non MBSR group. For the group of respondents without mindfulness training, we leveraged the databases of two leading business schools in France. In the email sent to potential respondents and the questionnaire itself, we explicitly indicated that respondents should not have attended any form of mindfulness training, nor be practicing mindfulness meditation. A total of 307 participants (64% women, 63% married, average age 41 years) with no prior MBSR training volunteered to participate.

3.2. Study sample

With a multivariate analysis of variance, we check if the two groups (with and without MBSR training) differ in their demographic variables (see Table 2). The results reveal no significant differences in terms of participants' socio-demographic variables ($F(4, 816) = 1.99, p = .10$, Wilks' Lambda = .99, effect size = .01). The univariate analyses of variance similarly reveal no significant differences in age ($F = .98, p = .28$), gender ($F = .35, p = .35$), education ($F = .47, p = .49$), or marital status ($F = 1.87, p = .15$).

Table 2. Samples' description (N=778)

	Group with MBSR N1 = 471	Group without MBSR N2 = 307
Gender	59.1% of women	64.2% of women
Age	$M = 42; SD = 10.28$	$M = 41; SD = 9.25$
Marital Status: Married	77.1%	63.2%
Number of children	0: 28.9% 1: 15.5% 2: 31.4% > =3: 24.2%	0: 33.2% 1: 13.7% 2: 32.6% > =3: 20.2%
Education	4.3%: high school 27.8%: undergraduate or bachelor's (BA) degree 67.9%: completed graduate studies/degrees.	2.2%: high school 28.7%: undergraduate or bachelor's (BA) degree 69.1%: completed graduate studies/degrees.
Profession	49.3%: high-level professionals and managers, 17.6%: heads of their firms, 27.4%: middle-level managers/professionals 5.7%: regular employees.	63.2%: high-level professionals and managers, 18.2%: heads of their firms, 11.2%: middle-level managers/professionals 7.4%: regular employees

3.3. Measurements

To measure *trait mindfulness*, we used the 15-item Mindful Attention Awareness Scale (Brown and Ryan, 2003), which ranges from “almost always” (1) to “almost never” (6). Then we applied a 3-item *ethical self-identity* scale from Sparks and Shepherd (1992), as adapted by Singh (2016), with a 7-point Likert-type scale ranging from “strongly disagree” (1) to “strongly agree” (7). It gauges the extent to which a person perceives him- or herself as someone who is worried about ethical issues related to society, welfare, or the natural environment. A sample item is, “As a consumer I think of myself as socially responsible.” Finally, to assess *GPI*, we used Lee’s (2009) 3-item scale, such as “I am aware of the environment in my buying behavior considering organic products or environmentally safe products,” with a 7-point Likert-type scale. Appendix 1 provides the list of items included in the measurement scales.

3.4. Statistical analysis

The tests of H1–H3 rely on structural equation modeling (SEM) in AMOS¹ version 26.0 (Arbuckle, 2011), for which we derive a measurement model (associations of scale items with their designated latent variables) and a structural model (associations between latent variables). We use several criteria to assess fit indicators (Vandenberg and Lance, 2000), namely, the chi-square and degrees of freedom ($\chi^2/df < 5$), incremental fit index (IFI > .90), Tucker–Lewis index (TLI > .90), comparative fit index (CFI > .90), and root mean square error of approximation (RMSEA < .10). For the simple mediation (H4) and moderated mediation (H5) predictions, we use models 4 and 8 in the SPSS macro developed by Preacher et al. (2007). The estimations reflect bootstrapping with 2,000 samples and 95% bias-corrected confidence intervals (CI).

¹ Following Kline (2016), we used the software AMOS (version 26.0) to test the measurement model (CFA) and the structural model (SEM). Following Hayes et al. (2017), we use models 4 and 8 in the SPSS macro to test the simple mediation (H4) and moderated mediation (H5) predictions,

4. Results

4.1. Descriptive statistics

In Table 3, we report the mean values and standard deviations of all of the items. Mindfulness relates positively to GPI ($r = .19$) and ethical self-identity ($r = .21$), and ethical self-identity relates positively to GPI ($r = .66$). We present composite reliability coefficients (Jöreskog's $rh\hat{o} > .70$), confirm internal convergent validity ($rh\hat{o}_{vc} > .50$), and check for discriminant validity (Fornell and Larcker, 1981). Table 3 summarizes the confirmatory factor analysis (CFA) results for the three scales across the whole sample.

Table 3. Variable correlations and reliability, whole sample (n = 778)

Variable	Trait Mindfulness	Ethical Self-Identity	GPI
Trait mindfulness	X		
Ethical self-identity	.21***	X	
GPI	.19**	.66***	X
Reliability (Joreskog's $rh\hat{o}$)	.84	.81	.78
Convergent validity	.52	.60	.55

** $p < .05$, *** $p < .01$

4.2. Measurement models

Our study includes 21 items and three factors: 15 items for trait mindfulness, 3 items for ethical self-identity, and 3 items for GPI. The CFA converges to the expected three-scale structure. In Model 1, we combine the 21-item, three-construct measure into a one-factor reflective model (Table 4). Most of the fit indexes are within or close to a reasonable range (Table 4, Model 2), in support of the three-factor structure.

Table 4. Measurement and structural model results

MEASUREMENT MODELS	χ^2	<i>df</i>	<i>p</i>	χ^2/df	<i>CFI</i>	<i>IFI</i>	<i>TLI</i>	<i>RMSEA</i>	<i>Models</i>	$\Delta\chi^2$	Δdf	ΔCFI	$\Delta RMSEA$
Measurement models on the whole sample													
1. Model 1: Reflective 21-item 1-factor	2,694.34	189	.00	14.25	.54	.54	.58	.12	1 vs. 2	2,091.70	3	.44	.07
2. Model 2: Reflective 21-item, 3-factor	602.64	186	.00	3.24	.90	.90	.91	.07					
Configural invariance for each group													
3. Model 3: Group with MBSR training (21-item, 3-factor)	362.51	186	.00	1.94	.94	.94	.94	.04					
4. Model 4: Group without MBSR training (21-item, 3-factor)	433.79	186	.00	2.33	.90	.90	.90	.06					
Measurement invariance for each group (MBSR / without MBSR) (MGFA)													
5. Model 5: Configural invariance	796.44	372	.00	2.14	.92	.91	.91	.03	5 vs. 6	26.59	18	.00	.01
6. Model 6: Metric invariance	823.03	390	.00	2.11	.91	.91	.91	.04					
STRUCTURAL MODELS													
7. Model 7: SEM model on the whole sample	605.64	186	.00	3.25	.93	.93	.92	.05					
8. Model 8: SEM model two groups (MBSR / without MBSR groups)	796.44	372	.00	2.14	.92	.92	.91	.03					

We checked for configural (factor structure) and metric (factor loading) invariance across the two groups (with MBSR training, $n = 471$, without MBSR training, $n = 307$), using multigroup CFA. Each of them achieved configural invariance (Table 4, Models 3 and 4). In confirmation of metric invariance, when we set all factor loadings to be the same across the two groups in a constrained multigroup CFA (Table 4, Models 5 and 6), the constrained and unconstrained models do not differ ($\Delta\text{CFI}/\Delta\text{RMSEA} < .01$) (Cheung and Rensvold, 2002).

4.3. Hypotheses testing

4.3.1. Main effects. We tested the structural model with the whole sample, using AMOS 26.0 software. The global fit measures suggested a good fit of the structural model (Table 4, Model 7) ($\chi^2 = 605.64$, $df = 186$, $\chi^2/df = 3.25$; $p < .01$; CFI = .93; IFI = .93; TLI = .92; RMSEA = .05). Trait mindfulness related positively to GPI ($\beta = .12$; $t = 2.30$; $p < .05$), in support of H1, and to ethical self-identity ($\beta = .21$; $t = 4.73$; $p < .001$), in support of H2. Ethical self-identity also was positively associated with GPI ($\beta = .22$; $t = 4.73$; $p < .001$), so we find support for H3.

4.3.2. Mediation effects. To test for simple mediation (trait mindfulness \rightarrow ethical self-identity \rightarrow GPI), we relied on model 4 of the SPSS macro (Preacher et al., 2007). The results affirmed the positive, statistically significant, indirect effect of trait mindfulness on GPI through ethical self-identity ($\gamma = .13$; CI [.07; .18]).

4.3.3. Moderation effect through MBSR training. First, the multigroup moderation analyses conducted to test the model for both groups (with and without MBSR training), revealed a good fit of the full model ($\chi^2 = 796.44$, $df = 372$, $p < .001$; adjusted $\chi^2/df = 2.14$; CFI = .92; IFI = .92; TLI = .91; RMSEA = .03, Table 4, Model 8). Second, to test the moderated mediation hypothesis, regarding the moderating effect of MBSR on the relationships between (1) trait mindfulness and self-ethical identity and (2) trait mindfulness and GPI, we used model 8 in the SPSS macro (Preacher et al., 2007). In Table 5, the index of

moderated mediation, which tests for significance according to the differences of the indirect effects across the moderator, was significant (index = .11; CI [.04; .21]). The conditional indirect effect was significant among participants with MBSR training ($\gamma = .15$; CI [.08; .22]), but not for the group without MBSR training ($\gamma = .04$; CI [-.03; .12]).

Table 5. Moderated mediation analyses

	ESI						GPI					
	β	SE	T	<i>p</i>	LL	UL	β	SE	T	<i>p</i>	LL	UL
TM	.36	.10	5.49	***	.16	.57	.21	.18	4.73	***	.13	.22
ESI							.52	.03	10.93	***	.48	.77
TM×ESI	.15	.06	2.24	**	.01	.28	.13	.05	2.27	**	.07	.18
Conditional direct effect of MBSR												
Without MBSR training	.06	.05	1.21	.22	-.03	.15	.02	.04	.48	.63	-.06	.10
MBSR training	.21	.04	4.64	***	.12	.30	.12	.05	2.21	**	.02	.13
Conditional indirect effect of MBSR												
Without MBSR training							.04	.04			-.03	.12
MBSR training							.15	.03			.08	.22
Index of moderated mediation							Index	Boot SE			LL	UL
							.11	.05			.04	.21

Notes: N = 778. PROCESS model 8, 95% CI, where β = unstandardized regression coefficient; SE = standard error; bootstrap sample size = 2,000; LL = lower limit; UL = upper limit; TM = trait mindfulness; ESI = ethical self-identity, and GPI = green purchase intentions.

** *p* < .05, *** *p* < .01

5. Discussion and future research avenues

5.1. Discussion

Our study makes three main contributions in nascent literature at the nexus of mindfulness and sustainable consumption research. First, it responds to calls for research into how inner dimensions and mindfulness may be linked to sustainability (Wamsler and Brink, 2018). Adding to the four previously proposed mechanisms for linking mindfulness to consumerism (i.e., disruption of routines, closure of the attitude–behavior gap, primacy of nonmaterialistic values and well-being, and pro-social behaviors; Fischer et al. 2017), we unveil a fifth explanatory mechanism, based in ethical self-identity or the extent to which a person perceives him- or herself as an ethical person (Peluso, 2015). Identity and ethics are essential for moving people toward more enduring, sustainable behaviors (Steg and Vlek, 2009). The psychological motivations underlying consumption behaviors relate to identity, and consumer actions have emotional or symbolic functions (Armstrong, 2012). Mindfulness fundamentally nurtures ethical values that nourish benevolence toward the environment (Grossman, 2015) and shifts the focus from reliance on consumption to the fulfillment of affective or symbolic needs. Our study increases understanding of the operating mechanisms by which mindfulness can induce GPI.

Second, a few existing ecological economics studies explore the interactions of mindfulness and sustainable behaviors, by investigating the benefits of mindfulness interventions (e.g., Bernal et al., 2018; Geiger et al. 2020; Ray et al. 2020) or trait mindfulness (e.g., Amel et al. 2009; Barbaro and Pickett, 2016), but without examining their roles in promoting PEB. In filling this gap, we find that dispositional mindfulness promotes PEB directly, as well as indirectly through increased ethical self-identity. A sound, extended MBSR training moderates these relationships too, such that they are stronger among people well-trained in mindfulness practice. This finding contests Geiger et al.'s (2020) assertion of

no significant increase in attitudes toward or actual sustainable consumption behaviors. We note that they implemented a pre-/post-experimental design and thus could not measure longer-term effects of the intervention. Our sample comprises people who completed the MBSR program any time in the previous two years, so we were able to capture some longer-term benefits and thus posit that our findings might represent an extension of Geiger et al.'s results.

Third, our study offers several practical insights. Thiermann and Sheate (2020) have called for innovative environmental interventions and strategies to invoke changes to personal-level values and worldviews, such as mindfulness interventions. We provide the first clear evidence in support of the potential of such mindfulness interventions, in the form of the solid and rigorous MBSR protocol. Notably, we tested our model among a sample of the general population, unlike existing studies that identify positive effects of mindfulness on PEB among specific populations (e.g., eco-fair visitors, Amel et al., 2009; organic food consumers, Essen and Martensson, 2014; ecologically and spiritually aware respondents, Jacob et al., 2009), which might have biased the interpretation of the findings. If ecological economists aim to promote effective change strategies that can transform society though, the interventions must be applicable to all people. In company settings, mindfulness interventions could usefully complement other environmental practices such as green-circular premium and sustainability certifications (Appolloni et al., 2022; Appolloni et al., 2021).

5.2. Limitations and future research avenues

We note some limitations of this research and provide avenues for future research. First, we use GPI to measure PEB, but if mindfulness interventions are to function as personal change strategies, aiming for a more sustainable society, it is important to clarify which sustainable attitudes and behaviors the mindfulness interventions can effectively influence. Future research could aim at designing and testing a comprehensive model of how

mindfulness influences pro-environmental behaviors. Such a model could take stock of existing findings and articulate the role of values (e.g. sense of community, Bernal et al., 2018; biospheric and altruistic values, Kaur and Luchs, 2022), self-identity (e.g. oneness with nature; Barbaro and Pickett, 2016), intentions (e.g. GPI; Dhandra 2019), and distinct types of ecologically sustainable behaviors such as recycling behavior, sustainable household choices and sustainable food practices (e.g. Jacob et al., 2009), or nutritional and clothing consumption behaviors (e.g. Geiger et al., 2020). Second, situational factors sometimes prevent people from acting according to their values, such as financial or time scarcity. It was out of the scope of this current research to consider such situational factors. However, future studies may consider factors such as age, household income and subjective experience of work-life imbalance as potential moderators of the mindfulness-sustainability relationships (Melo et al., 2018). Third, we conducted our study in Europe. It is important to replicate this study in other regions, considering the likelihood that cultural differences could have boundary effects. Doing so would add a social and cultural dimension to mindful consumption (Fischer et al., 2017), allowing for larger societal changes. Fourth, considering consumption as a social practice (Giddens, 2008), future research could extend the current dominant individual focus of mindfulness studies in sustainability research to the collective level and explore the potential of mindfulness to curve existing consumption practices through questioning the shared – and often unsustainable – conceptions of consumption norms or standards (Power and Mont, 2010). Fifth, due to the constraints of the cross-sectional data we use in this study, questions also remain regarding causality among our variables. Although we used sound theory to develop our hypotheses, longitudinal studies would be helpful to validate their causal directionality. In this vein, experimental designs could test the effectiveness of sustainability - adapted MBIs (Geiger et al., 2019).

If mindfulness is to be considered an effective experiential strategy for PEB, MBIs should then be introduced in influential spheres. First steps in this direction have been taken, such as the mindfulness courses provided to EU officials to help them tackle the climate crises (Booth, 2022). Such initiatives could be extended to the public sector, in the context of Green Public Procurement policies (GPP; Cheng et al., 2017). Local governments and managers of public sectors - typical key stakeholders influencing GPP (Liu et al., 2021) – could also benefit from MBIs. Further, in the private sector, top management could be an interesting population to expose to mindfulness training in the context of green human resource management, as they are influential in environmental certification practices (Ma et al., 2020). Mindful practices could be integrated into lean and agile practices that were found effective for enhancing ecologically sustainable operations (Mathiyazhagan et al., 2021).

6. Conclusion

Evolving beyond capitalism while flourishing as a society respectful of the planet requires a shift in our value system. Recently, ecological economists have proposed to move away from mainstream normative assumptions for PEB and suggested experiential strategies to trigger individual motivation for social transition. Grounded in self-determination theory, mindfulness has documented transformative effects on the inner dimensions of individuals. Mindfulness contributes to building a clearer sense of self, resulting in positive attitudes toward sustainable consumption and autonomy in choosing sustainable patterns. The current study extends prior insights about the mechanisms by which dispositional mindfulness fosters PEB, by uncovering the role of ethical self-identity. Further, our findings confirm that mindfulness training augments the benefits of dispositional mindfulness toward GPI. Mindful consumers can be the change agents needed to transition toward a more sustainable world, and mindfulness training appears to be an effective environmental intervention that researchers, practitioners, and policy makers should adopt.

References

- 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(1), 14-25.
- Akenji, L., 2014. Consumer scapegoatism and limits to green consumerism. *J. Clean. Prod.* 63, 13-23.
- Akerlof, G. A., Kranton, R. E., 2000. Economics and identity. *Q. J. Econ.* 115(3), 715-753.
- Appolloni A., Charbel Jose Chiappetta Jabbour, D'Adamo I., Gastaldi M., Settembre-Blundo D., 2022. Green recovery in the mature manufacturing industry: The role of the green-circular premium and sustainability certification in innovative efforts. *Ecol. Econ.* 193, 107311.
- Appolloni A., D'Adamo I., Gastaldi M., Santibanez-Gonzalez D.R. E. Settembre-Blundo D. 2021. Growing e-waste management risk awareness points towards new recycling scenarios: The view of the Big Four's youngest consultants. *Environ. Technol.* 23, 101716.
- Arbuckle, J. L. (2011). *IBM SPSS Amos 20 user's guide*. Amos Development Corporation, SPSS Inc, 226-229.
- Arlı, D., Tan, L. P., Tjiptono, F., Yang, L., 2018. Exploring consumers' purchase intention towards green products in an emerging market: The role of consumers' perceived readiness. *Int. J. Consum. Stud.* 42(4), 389-401.
- Armstrong, A., 2012. *Mindfulness and consumerism: A social psychological investigation*. PhD Thesis, University of Surrey (United Kingdom).
- 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. *J. Public Policy Mark.* 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. *Pers. Individ. Differ.* 93, 137-142.
- Barbarossa, C., De Pelsmacker, P., and Moons, I. 2017. Personal values, green self-identity and electric car adoption. *Ecol. Econ.* 140, 190-200.
- Barber, N. A., Deale, C., 2014. Tapping mindfulness to shape hotel guests' sustainable behavior. *Cornell Hosp. Q.* 55(1), 100-114.

- Bargh, J. A., Chartrand, T. L., 1999. The unbearable automaticity of being. *Am. Psychol.* 54(7), 462.
- Berkovich-Ohana, A., Glicksohn, J., Goldstein, A., 2012. Mindfulness-induced changes in gamma band activity—implications for the default mode network, self-reference and attention. *Clin. Neurophysiol.* 123(4), 700-710.
- Berkovich-Ohana, A., Glicksohn, J., Goldstein, A., 2014. Studying the default mode and its mindfulness-induced changes using EEG functional connectivity. *Soc. Cogn. Affect. Neurosci.* 9(10), 1616-1624.
- Bernal, E., Edgar, D., Burnes, B., 2018. Building sustainability on deep values through mindfulness nurturing. *Ecol. Econ.* 146, 645-657.
- Bina, O., Vaz, S. G., 2011. Humans, environment and economies: From vicious relationships to virtuous responsibility. *Ecol. Econ.* 72, 170-178.
- Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., ... Devins, G., 2004. Mindfulness: a proposed operational definition. *Clin. Psychol.* 11(3), 230.
- Booth, R. 2022. EU officials being trained to meditate to help fight climate crisis. <https://www.theguardian.com/world/2022/may/04/eu-bureaucrats-being-trained-meditate-help-fight-climate-crisis>. Retrieved October 13, 2022
- Brown, K. W., Kasser, T., 2005. Are psychological and ecological well-being compatible? The role of values, mindfulness, and lifestyle. *Soc. Indic. Res.* 74(2), 349-368.
- Brown, K. W., Ryan, R. M., 2003. The benefits of being present: mindfulness and its role in psychological well-being. *J. Pers. Soc. Psychol.* 84(4), 822-848.
- Brown, K. W., Ryan, R. M., Creswell, J. D., 2007. Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychol. Inq.* 18(4), 211-237.
- Burch, M. A., 2000. *Stepping Lightly: Simplicity for People and the Planet*. New Catalyst Books
- Burroughs, J., Rindfleisch, A., 2002. Materialism and well-being: A conflicting values perspective. *J. Consum. Res.* 29, 348–370.
- Carlson, E. N., 2013. Overcoming the barriers to self-knowledge: Mindfulness as a path to seeing yourself as you really are. *Perspect. Psychol. Sci.* 8(2), 173-186.
- Carroll, J., 2016. Formless meditation and sustainability. In: Dhiman, S., Marques, J. (Eds.), *Spirituality and Sustainability: New Horizons and Exemplary Approaches*. Springer, Switzerland.

- Chaskalson, M., & Hadley, S. G., 2015. Mindfulness: Historical and contemplative context and recent developments. In Reb, J., Atkins, P. W. (Eds.), *Mindfulness in organizations: Foundations, research, and applications*. Cambridge University Press.
- Chan, R. Y., 2001. Determinants of Chinese consumers' green purchase behavior. *Psychol. Mark.* 18(4), 389-413.
- Cheng, W., Appolloni, A., D'Amato, A., & Zhu, Q., 2018. Green Public Procurement, missing concepts and future trends—A critical review. *J. Clean. Prod.* 176, 770-784.
- Cheung, G. W., Rensvold, R. B. 2002. Evaluating goodness-of-fit indexes for testing measurement invariance. *Struct. Equa. Modeling.* 9, 233-255.
- Costanza, R. (2020). Ecological economics in 2049: Getting beyond the argument culture to the world we all want. *Ecol. Econ.* 168, 106484.
- Daniels, P. L., 2010. Climate change, economics and Buddhism—Part I: An integrated environmental analysis framework. *Ecol. Econ.* 69(5), 952-961.
- Deci, E. L., Ryan, R. M., 2013. *Intrinsic motivation and self-determination in human behavior*. Springer Science and Business Media.
- Dhandra, T. K. (2019). Achieving triple dividend through mindfulness: More sustainable consumption, less unsustainable consumption and more life satisfaction. *Ecol. Econ.* 161, 83-90.
- Dharmesti, M., Merrilees, B., and Winata, L. (2020). “I’m mindfully green”: examining the determinants of guest pro-environmental behaviors (PEB) in hotels. *J. Hosp. Mark. Manag.* 29(7), 830-847.
- Dhiman, S., Marques, J. (Eds.), 2016. *Spirituality and Sustainability: New Horizons and Exemplary Approaches*. Springer, Switzerland.
- Ericson, T., Kjønstad, B. G., and Barstad, A. (2014). Mindfulness and sustainability. *Ecol. Econ.* 104, 73-79.
- Essen, E. von, Mårtensson, F., 2014. Young adults' use of food as a self-therapeutic intervention. *Int. J. Qual. Stud. Health Well-being.* 9, 23000.
- Farb, N. A., Segal, Z. V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., Anderson, A. K., 2007. Attending to the present: mindfulness meditation reveals distinct neural modes of self-reference. *Soc. Cogn. Affect. Neurosci.* 2(4), 313-322.

- Fischer, D., Stanzus, L., Geiger, S., Grossman, P., Schrader, U., 2017. Mindfulness and sustainable consumption: A systematic literature review of research approaches and findings. *J. Clean. Prod.* 162, 544-558.
- Fornell, C., and Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *J Mark Res* .18, 382-388.
- Gatersleben, B., Murtagh, N., Cherry, M., and Watkins, M., 2019. Moral, wasteful, frugal, or thrifty? Identifying consumer identities to understand and manage pro-environmental behavior. *Environ. Behav.* 51(1), 24-49.
- Geiger, S. M., Fischer, D., Schrader, U., Grossman, P., 2020. Meditating for the planet: effects of a mindfulness-based intervention on sustainable consumption behaviors. *Environ. Behav.* 52(9), 1012-1042.
- Giddens, A., 2008. *The constitution of society. Outline of the theory of structuration.* Polity Press, Cambridge.
- Green-Demers, I., Pelletier, L. G., Ménard, S., 1997. The impact of behavioural difficulty on the saliency of the association between self-determined motivation and environmental behaviours. *Can. J. Behav. Sci.* 29(3), 157.
- Grossman, P., 2015. Mindfulness. Awareness informed by an embodied ethic. *Mindfulness* 6, 17–22.
- Hanley, A. W., Garland, E. L., 2017. Clarity of mind: Structural equation modeling of associations between dispositional mindfulness, self-concept clarity and psychological well-being. *Pers. Individ. Differ.* 106, 334-339.
- Harris, J.M., 2004. Global environmental challenges of the twenty-first century: Resources, consumption, and sustainable solutions. *Ecol. Econ.* 50, 315–316.
- Hüttel, A., Balderjahn, I., Hoffmann, S., 2020. Welfare beyond consumption: The benefits of having less. *Ecol. Econ.* 176, 106719.
- 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(2), 275-294.
- Johe, M. H., Bhullar, N., 2016. To buy or not to buy: The roles of self-identity, attitudes, perceived behavioral control and norms in organic consumerism. *Ecol. Econ.* 128, 99-105.

- 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. *Gen. Hosp. Psychiatry*. 4(1), 33-47.
- Kaur, T., Luchs, M. G., 2022. Mindfulness enhances the values that promote sustainable consumption. *Psychol. Mark.* 39(5), 990-1006.
- 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.
- Kline, R. B. 2016. *Principles and Practice of Structural Equation Modeling* (4th ed.). New York, NY: The Guilford Press
- Krägeloh, C. U., 2016. Importance of morality in mindfulness practice. *Couns. Values*. 61(1), 97-110.
- Lee, K., 2009. Gender differences in Hong Kong adolescent consumers' green purchasing behavior. *J. Consum. Mark.* 26(2), 87-96.
- Li, W., Bhutto, T. A., Xuhui, W., Maitlo, Q., Zafar, A. U., Bhutto, N. A., 2020. Unlocking employees' green creativity: The effects of green transformational leadership, green intrinsic, and extrinsic motivation. *J. Clean. Prod.* 255, 120229.
- Leiberg, S., Klimecki, O., Singer, T., 2011. Short-term compassion training increases prosocial behavior in a newly developed prosocial game. *PloS One* 6, e17
- Lim, D., Condon, P., DeSteno, D., 2015. Mindfulness and compassion: an examination of mechanism and scalability. *PloS One* 10, e0118221
- Liu, J., Ma, Y., Appolloni, A., & Cheng, W., 2021. How external stakeholders drive the green public procurement practice? An organizational learning perspective. *J. Public Procure.* 21(2), 138-166
- Lorek, S., Spangenberg, J. H., 2014. Sustainable consumption within a sustainable economy—beyond green growth and green economies. *J. Clean. Prod.* 63, 33-44.
- Ma, Y., Liu, Y., Appolloni, A., & Liu, J., 2021. Does green public procurement encourage firm's environmental certification practice? The mediation role of top management support. *Corp. Soc. Responsib. Environ.* 28(3), 1002-1017.
- Mabsout, R., 2015. Mindful capability. *Ecol. Econ.* 112, 86-97.
- Mathiyazhagan, K., Agarwal, V., Appolloni, A., Saikouk, T., & Gnanavelbabu, A., 2021. Integrating lean and agile practices for achieving global sustainability goals in Indian manufacturing industries. *Technol. Forecast. Soc. Change.* 171, 120982.

- Melo, P. C., Ge, J., Craig, T., Brewer, M. J., Thronicker, I., 2018. Does work-life balance affect pro-environmental behaviour? Evidence for the UK using longitudinal microdata. *Ecol. Econ.* 145, 170-181.
- Menger, A. K. Hamm, U., 2021. Consumers' knowledge and perceptions of endangered livestock breeds: How wording influences conservation efforts. *Ecol. Econ.* 188, 107-117.
- Monteiro, L. M., Musten, R. F., Compson, J., 2015. Traditional and contemporary mindfulness: Finding the middle path in the tangle of concerns. *Mindfulness*, 6(1), 1-13.
- Nuttin, J. R., 1987. The respective roles of cognition and motivation. In F. Halisch & J. Kuhl (Eds.), *Motivation, Intention and Volition* (pp. 309-320). Springer-Verlag, Berlin; New York.
- O'Brien, K., 2018. Is the 1.5°C target possible? Exploring the three spheres of transformation. *Curr. Opin. Environ. Sustain.* 31, 153–160.
<https://doi.org/10.1016/j.cosust.2018.04.010>.
- Oliver, J. D., Lee, S. H., 2010. Hybrid car purchase intentions: a cross-cultural analysis. *J. Consum. Mark.* 27(2), 96-103.
- Pagiaslis, A., Krontalis, A.K., 2014. Green consumption behavior antecedents: environmental concern, knowledge, and beliefs. *Psychol. Mark.* 31(5), 335–348.
- Panno, A., Giacomantonio, M., Carrus, G., Maricchiolo, F., Pirchio, S., Mannetti, L., 2018. Mindfulness, pro-environmental behavior, and belief in climate change: the mediating role of social dominance. *Environ. Behav.* 50(8), 864-888.
- Parodi, O., Tamm, K. (Eds.), 2018. *Personal Sustainability: Exploring the Far Side of Sustainable Development*. Routledge.
- Pelletier, L.G., Baxter, D., Huta, V., 2011. Personal autonomy and environmental sustainability. In: Chirkov, V.I., Ryan, R.M., Sheldon, K.M. (Eds.), *Human Autonomy in Cross-Cultural Context*, pp. 257–277.
- Peluso, A. M., 2015. Psychological drivers in the adoption of morally controversial innovations: the moderating role of ethical self-identity. *Bus. Ethics.* 24(3), 252-263.
- 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.

- Preacher, K. J., Rucker, D. D., Hayes, A. F. 2007. Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behav. Res.* 42, 185-227.
- Ramayah, T., Lee, J.W.C., Mohamad, O., 2010. Green product purchase intention: some insights from a developing country. *Resour. Conserv. Recycl.* 54(12), 1419–1427.
- Ray, T. N., Franz, S. A., Jarrett, N. L., Pickett, S. M., 2020. Nature enhanced meditation: effects on mindfulness, connectedness to nature, and pro-environmental behavior. *Environ. Behav* 1-27.
- Richins, M.L., Dawson, S., 1992. A consumer values orientation for materialism and its measurement. Scale development and validation. *J. Consum. Res.* 19(3), 303-316.
- Rosenberg, E. L. 2004. Mindfulness and consumerism, in T. Kasser and A. D. Kanner (eds.), *Psychology and Consumer Culture: The Struggle for a Good life in a Materialistic world* (American Psychological Association, Washington DC), pp. 107–125.
- Ruedy, N. E., Schweitzer, M. E., 2010. In the moment: The effect of mindfulness on ethical decision making. *J. Bus. Ethics.* 95(1), 73-87.
- Ryan, R.M., Deci, E.L., 2008. A self-determination theory approach to psychotherapy: the motivational basis for effective change. *Can. Psychol.* 49(3), 186–193.
- Sama, C., Crespo-Cebada, E., Diaz-Caro, C. Escribani, M. Mesias, F.J., 2018. Consumer preferences for foodstuffs produced in a socio-environmentally responsible manner: a threat to fair trade producers? *Ecol. Econ.* 150, 290-296.
- Scharmer, C. O., 2009. *Theory U: Learning from the future as it emerges.* Berrett-Koehler Publishers.
- Shapiro, S. L., Jazaieri, H., Goldin, P. R., 2012. Mindfulness-based stress reduction effects on moral reasoning and decision making. *J. Posit. Psychol.* 7(6), 504-515.
- Shaw, D., Hogg, G., Wilson, E., Shui, E., Hassan, L., 2006. Fashion victim: the impact of fair trade concerns on clothing choice. *J. Strateg. Mark.* 14(4), 427–440
- Shaw, D., Shiu, E., 2002. The role of ethical obligation and self-identity in ethical consumer choice. *Int. J. Consum. Stud.* 26(2), 109-116.
- Shaw, D., Shiu, E., 2003. Ethics in consumer choice: a multivariate modeling approach. *Eur. J. Mark.* 37(19), 1485-1498.

- Sheth, J. N., Sethia, N. K., Srinivas, S., 2011. Mindful consumption: a customer-centric approach to sustainability. *J. Acad. Mark. Sci.* 39(1), 21-39.
- Singh, J., 2016. The influence of CSR and ethical self-identity in consumer evaluation of cobrands. *J. Bus. Ethics.* 138(2), 311-326.
- Sparks, P., Shepherd, R., 1992. Self-identity and the theory of planned behavior: Assessing the role of identification with "green consumerism". *Soc. Psychol. Q.* 388-399.
- Steg, L., Vlek, C., 2009. Encouraging pro-environmental behaviour: An integrative review and research agenda. *J. Environ. Psychol.* 29(3), 309-317.
- Stets, J. E., Biga, C. F., 2003. Bringing identity theory into environmental sociology. *Sociol. Theory.* 21(4), 398-423.
- Thiermann, U. B., Sheate, W. R., 2020. Motivating individuals for social transition: The 2-pathway model and experiential strategies for pro-environmental behaviour. *Ecol. Econ.* 174, 106668.
- Trudel, R., Argo, J. J., Meng, M. D., 2016. The recycled self: consumers' disposal decisions of identity-linked products. *J. Consum. Res.* 43(2), 246-264.
- Vandenberg, R. J., Lance, C. E., 2000. A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organ. Res. Methods.* 3(1), 4-69.
- Van der Werff, E., Steg, L., Keizer, K., 2013. The value of environmental self-identity: The relationship between biospheric values, environmental self-identity and environmental preferences, intentions and behaviour. *J. Environ. Psychol.* 34, 55-63.
- Verhaeghen, P., 2015. Good and well: The case for secular Buddhist ethics. *Contemp. Buddhism.* 16(1), 43-54.
- Wamsler, C., 2018. Mind the gap: The role of mindfulness in adapting to increasing risk and climate change. *Sustain. Sci.* 13(4), 1121-1135.
- Wamsler, C., 2019. Contemplative sustainable futures: the role of individual inner dimensions and transformation in sustainability research and education. In: Leal, W., Adriana, F., Mccrea, C. (Eds.), *Sustainability and the Humanities*, pp. 359-373.
- Wamsler, C., Brink, E., 2018. Mindsets for sustainability: Exploring the link between mindfulness and sustainable climate adaptation. *Ecol. Econ.* 151, 55-61.

- Wamsler, C., Brossmann, J., Hendersson, H., Kristjansdottir, R., McDonald, C., Scarampi, P., 2018. Mindfulness in sustainability science, practice, and teaching. *Sustain. Sci.* 13(1), 143-162.
- Wang, J., Geng, L., Schultz, P. W., Zhou, K., 2019. Mindfulness increases the belief in climate change: The mediating role of connectedness with nature. *Environ. Behav.* 51(1), 3-23.
- 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. *J. Environ. Psychol.* 30(3), 305-314.

Appendix 1. Measurement scales used in the survey

Measures	Items
Mindfulness* (MAAS; Brown & Ryan, 2003)	I could be experiencing some emotion and not be conscious of it until sometime later. I break or spill things because of carelessness, not paying attention, or thinking of something else. I find it difficult to stay focused on what's happening in the present. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way. I tend not to notice feelings of physical tension or discomfort until they really grab my attention. I forget a person's name almost as soon as I've been told it for the first time. It seems I am "running on automatic" without much awareness of what I'm doing. I rush through activities without being really attentive to them. I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there. I do jobs or tasks automatically, without being aware of what I'm doing. I find myself listening to someone with one ear, doing something else at the same time. I drive places on 'automatic pilot' and then wonder why I went there. I find myself preoccupied with the future or the past. I find myself doing things without paying attention. I snack without being aware that I'm eating.
Ethical self-identity** (Singh, 2016)	As a consumer I think of myself as socially responsible I think of myself as someone concerned about a company's activities that benefits the society. As a consumer, I am orientated toward buying products that are made keeping the society's welfare in mind
Green purchase intentions (GPI)** Lee (2009)	I am aware of the environment in my buying behavior considering organic products or environmentally safe products I worry about environmental issues in my purchases considering for example products that use recycled/recyclable packaging or products that contain no or fewer chemical ingredients' I feel guilty when I don't consider environmentally responsible products

* "almost always" (1) to "almost never" (6)

** "strongly disagree" (1) to "strongly agree" (7)