May you be happy and well. Meditation and pro-environmental choice.

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Abstract:

Taking into account past evidence, this paper defends that loving-kindness meditation may be a powerful intervention to drive sustainable choices. This type of meditation enhances ego-transcendence and social connectedness which have been proven key antecedent of sustainable habits. In an experimental setting, this paper tests whether loving kindness meditation is more effective than mindfulness meditation in driving a sustainable choice. The paper finds confirmation for this hypothesis only among naive meditators. However, experienced meditators choose the pro-environmental product to a greater extent than naive meditators, regardless of the type of meditation. This is the first paper to conduct an experimental study to assess the effectiveness of meditation on pro-environmental choice. The findings guide the design of meditation-based interventions that are more likely to lead to sustainable choices.

Meditation, mindfulness, sustainable behaviour, loving kindness meditation

Track: Social responsibility and ethics

1. Introduction

Our dominant structures of production and consumption are built around the logic of infinite material growth and endless wealth accumulation, enacted by human actors assumed to behave as *homo economicus*. The socio ecological crises that this logic involves (Steffen et al., 2015) calls for a shift in the model of human behavior required for the sustainability project, widening it beyond that of the self-interest and utility-maximization of *homo economicus* (Bina & Vaz, 2011). Such a shift includes an expanded relationship of the human being with itself, with others -contemporary and future, human and non-human-, and with nature.

Meditation has great potential for transcending the self-centered focus in one's behavior and for opening this focus to a universalist perspective, cultivating intrinsic values and empathy towards other living creatures (Ericson, Kjønstad, &Barstad, 2014). Indeed, the interest in meditation has grown rapidly in the past three decades and a number of studies provide evidence of meditation as a fundamental intervention to facilitate changes on oneself, enhancing awareness and ego decentering (Franquesa et al., 2017) which would result in the much needed sustainable or pro-environmental behaviour (Ericson et al., 2014; Fischer, Stanszus, Geiger, Grossman, & Schrader, 2017).

Nevertheless, it can be argued that not any type of meditation would be equally effective for this purpose. Fredrickson et al. (2017) established the distinction between mindfulness meditation (MM) and loving kindness meditation (LKM), on the basis of their unfolding distinct psychological processes. While MM entails cultivating non-reactive disposition towards one's thoughts and emotions, LKM focuses on cultivating positive emotions towards oneself and others.

We argue that LKM should be more effective than MM to cultivate frames of reference (i.e. mindsets, habits of mind, meaning perspectives, emotions) (Mezirow, 1997) that are more aligned to sustainability challenges. While MM puts emphasis on cognitive practices oriented to cultivate bare attention (Dorjee, 2010), LKM is associated with practices designed to cultivate wholesome emotions; rather than distancing from emotions, they facilitate nurturing compassionate attitudes of love and caring toward others and nature (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008; Kristeller & Johnson, 2005). Moreover, Buddhist-inspired practices such as LKM tend to enhance ethical awareness, understood as "an attitude of abstention that turns your mind away from harming others and from sources of such harm" (Tsong-Kha-Pa, 2004, p.143).

Evidence supports this rationale. Studies on LKM have shown that this type of meditation increases altruism by nurturing compassion and social connectedness. Hutcherson, Seppala, and Gross (2008) found that after a 7 minute LKM increased positivity towards strangers. Also, significant effects on compassion and positive emotions (Singer & Klimecki, 2014) and on helping behaviour (Leiberg, Klimecki, & Singer, 2011) have been observed after a one-day course of LKM or compassion meditations. In contrast, a brief intervention based on MM (Fernando, Skinner, & Consedine, 2017) did not significantly enhance compassion.

The present study compares the effect of a brief LKM or MM practice on sustainable choices. Also, it tests whether the valence and type of emotions triggered by each meditation is different and whether these emotions influence differently the subsequent choice. Emotions are posited as a mediating mechanism to explain the association between LKM and sustainable behaviour.

Few studies have examined the relationship between mindfulness and pro-environmental behaviour (PEB hereafter). In the most recent systematic review, Fischer et al. (2017) found seven studies. All these correlational studies have yielded unanimous evidence: dispositional mindfulness or mindfulness-as-a-trait has been systematically found an antecedent of declared PEB (e.g., Amel, Manning, & Scott, 2009; Jacob, Jovic, & Brinkerhoff, 2009). Other studies have introduced other constructs that operate as mediators in this relationship, notably connectedness with nature (e.g. Barbaro & Pickett, 2016) or reduced social dominance orientation (Panno et al., 2018). Based on previous evidence, LKM is more likely to influence these mediating constructs, as explained above.

To our knowledge, this is the first paper to test the effects of meditation on sustainable choices. Past studies have found a positive association between mindfulness-as-a-trait and declared PEB (Jacob, Jovic, & Brinkerhoff, 2009). However, no experimental, randomized controlled studies have tested whether interventions based on meditation may drive sustainable choices. Also, the causation relationship among the examined constructs is unclear; although mindfulness is posited as an antecedent of PEB, the method used in previous studies does not allow to ensure that mindfulness precedes PEB which is a condition to establish causality. This paper intends to redress this shortcoming of previous studies, thus contributing to the growing research on the effects of meditation on pro-social behaviour. Also, this paper wants to serve to develop sustainable lifestyles since our results will help actors involved in sustainability programmes (for instance, educators) to design meditation-based interventions that are more likely to lead to sustainable choices.

2. Method

2.1. Participants. 115 participants responded to a public call to take part in a brief mindfulness activity. Participants were randomly assigned either to the group doing LKM or to the MM practice, that was treated as a control group.

2.2. Intervention. The structure of the session was similar in the two groups. After completing the first questionnaire, with the baseline measures (demographic variables, mindfulness-as-a-trait, declared PEB and meditation experience), participants were requested to listen to an audio.

The audios used in the two groups were similar in length (11 minutes) and were recorded by the same person. The content of the LKM audio was designed following metta meditation practice which cultivates compassionate love toward the self and engagement with others (Kristeller and Johnson, 2005). Participants in the LKM group were given instructions to remain in a comfortable position, close their eyes and gradually place their attention on an initial intrapersonal-oriented meditation, focusing from inner sensations, thoughts and feelings to a more compassionate awareness of themselves and messages of care and love. Participants were then asked to shift their focus to an interpersonal meditation and expand their awareness gradually towards relatives, strangers, humanity and finally the whole universe, sending them compassionate care and love messages.

Those assigned to the mindfulness meditation group received the traditional intrapersonal meditation of body scan which place the focus on the awareness of the physical sensations and a non.judgmental stance towards emotions, thoughts and feelings that could come and go through the practice. Participants were given instructions to find a comfortable position and change gradually their attention towards different parts of their bodies. Focus was then placed on the breath and the awareness of the different sensations that might arise shifting gradually the attention from toes to head. Once the scan was completed, participants were asked to get an awareness of their whole bodies and the feelings after the practice. The content of this audio was designed following the recommendations of initial formal meditation practices (Carmody, Baer, Lykins, & Olendzki, 2009).

After listening to the audio, participants were asked to reflect on their experience during and immediately after the practice. They were given paper and pencil and asked to write their thoughts and emotions. Then, they were invited to fill a brief questionnaire with two tasks: first, participants were asked to provide four adjectives that reflected how they felt; second, they were requested to choose the chocolate bar they wanted as a token of appreciation for their participation in the study. Participants were then debriefed, thanked and given a fair trade and organic chocolate bar.

2.3. Measures

Mindfulness-as-a-trait The Spanish version of the 15-item Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003; Soler et al., 2012) used to assess attention to and awareness in day-to-day life. Example items include "It seems I am 'running on automatic' without much awareness of what I'm doing" or "I find it difficult to stay focused on what's happening in the present.". Ratings were made on a 6-point scale where higher scores indicate greater mindfulness. The MAAS scale is a simple, easy to administer scale and, since it has a unidimensional factor structure, it gives a single score of dispositional mindfulness (Soler et al., 2012). Moreover, the wording of the items, formulating mindless rather than mindful states, was adequate to the sample used: general public that were not required to have a certain knowledge or experience with mindfulness practices (Brown and Ryan, 2003). Internal consistency of the scale was good (α=0.87).

PEB. A translated version of the 5-point Likert conservation scale of the pro-environmental behaviour scale (Markle, 2013) was used to measure green behaviour. This scale was chosen because it is short, easy to administer, and the seven items cover different facets of energy conservation behaviour that are within reach of most people. Example items include "How often do you turn off the lights when leaving a room?" or "How often do you switch off standby modes of appliances or electronic devices?". Internal consistency of the scale was acceptable (α=.69).

Meditation experience. Following Fox et al. (2012), two questions were used to assess meditation practice: frequency of meditation (6-point scale from daily to never) and the number of years of meditation practice (6-point scale from never to more than ten years). Scores to both questions were multiplied to obtain a single measure. According to these scores, the sample was segmented into naive (participants without any meditation experience) or experienced meditators. Past studies have repeatedly pointed out that meditation experience moderates results (Fredrickson et al., 2017). This segmentation was retained for further analyses. Other demographic variables used as control were sex, age, and having children.

Sustainable choice. After describing the emotions felt after the practice, participants were asked to choose the chocolate bar they would receive as a token of appreciation for their participation. They were shown three choices: "100% taste", "100% sustainable" or "100% preservatives-free". The three images used were identical except for the label. *Sustainable choice* was codified as a dichotomous variable (1 for the sustainable chocolate choice or 0 otherwise).

3. Results

Attrition check

Questionnaire 1 was filled out by 111 participants, (4 of the 115 initial participants refused to do it), while 101 participants completed the questionnaire at time 2, resulting in an attrition rate of 9%. To examine whether respondents and non-respondents were similar ANOVA analyses were conducted and no significant differences were found except for age (F=5.374; p-value=.022). Thus, the valid sample for each group was 69 (LKM) and 32 (MM).

Randomness check

ANOVA tests were conducted to test homogeneity between groups receiving LKM and CBM on the control variables. No differences were found (PEB: M_{LKM}=3.828; M_{MM}=3.395; F=.74; p-value=.391; Meditation: M_{LKM}=1.391; M_{MM}=1.515; F=.04; p-value =.847; Mindfulness-as-a-trait: M_{LKM}=3.712; M_{MM}=3.675; F=.05; p-value =.823; Female: P_{LKM}=76.8; P_{MM}=72.7; F=.20; p-value =.657; Age: M_{LKM}=41.8; M_{MM}=42.6; F=.08; p-value =.784; Children: P_{LKM}=48.4; P_{MM}=39.1; F=.879; p-value =.378).

Models

The sample was split into two groups on the basis of their meditation experience (naive meditators vs. experienced meditators). A small percentage (31.7) of participants reported having experience in meditation. Both groups were very similar regarding control variables (p-value > .05). Specifically, there were not differences in PEB; naive and experienced meditators had the same level of dispositional pro-environmental behaviour (M_{Naive}=3.866; $M_{Experienced}$=3.861).

A binary logit model was conducted to assess whether or not the intervention had an impact on sustainable behaviour. Correlations were not problematic, as all of them were under .25. As shown in table 1, for naive meditators the only significant variable driving the sustainable choice as the intervention. As expected, those in the LKM group were more likely (24.24 points) to choose the sustainable chocolate. However, for the experienced meditators the intervention is non-significant.

	Naive (N=69)		Experienced (N=32)	
	marginal effects	p-value	marginal effects	p-value

LKM	**.2421**	**.045**	******	**.0273**	**.868**
	(.121)			***(.164)***	
PEB	.1516	.113		.1286	.325
	(.096)			*(.131)*	
Mindfulness as a trait	-.0016	.984		-.1733	.064 *
	(.079)			*(.094)*	
Female (%)	-.1494	.262		.1643	.433
	(.133)			*(.210)*	
Age	-.0012	.848		.0117	.212
	(.006)			*(.009)*	
Children (yes/no)	.1767	.307		.0995	.643
	(.173)			*(.215)*	
pseudo R^2	.081			.1585	
N	69			32	

****, **,* Statistically significant at the 1,5,10% levels correspondingly.*

Table 1. Logit model for Naive and Experienced Meditators. Standard errors in brackets

However, cross-tabulation of segment and type of meditation shows that experienced meditators chose, to a greater extent, the sustainable chocolate, regardless the type of meditation they were assigned to. In contrast, naive meditators in the LKM group chose the sustainable chocolate to a greater extent than their peers in the MM group. ANOVA tests showed that differences between naive and experienced meditators on sustainable choice, regardless the type of intervention, are significant, but only at the 10% level (F=: 2.72; p-value=.10).

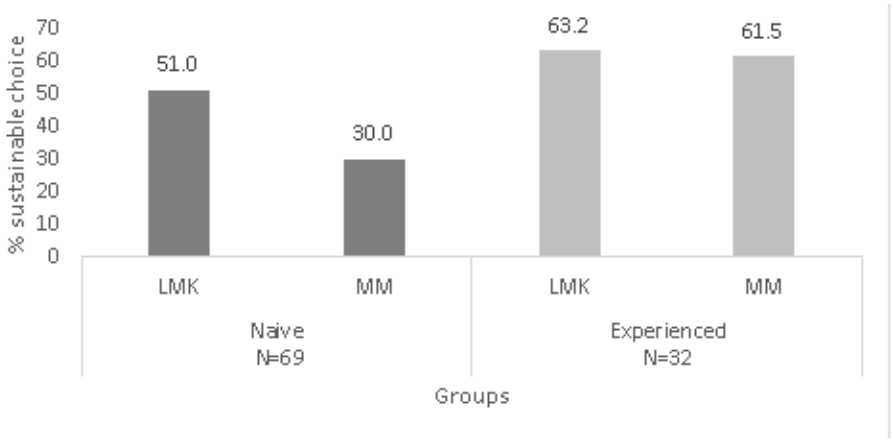

Fig. 1. Cross tabulation of meditation experience, meditation type and sustainable choice

These results suggest that LKM is a more powerful intervention than MM to promote pro-environmental behaviour only for naïve meditators. This partially supports the first hypothesis, as the effect of LKM on experienced meditators is non-significant. Given that the level of dispositional PEB was similar in naive and experienced meditators, our data suggest that both types of meditation intervention would be effective to drive sustainable choices, once the individual has meditation experience.

4. Conclusion

Despite the proliferation of studies on the effects of meditation practices, there is a claim for further academic research to shed light into the relationship between meditation and sustainability (Ericson et al., 2014). In particular, the present study examined whether LKM was more effective in driving pro-environmental behaviour.

First, our results evidence that naive and experienced meditators responded differently to the interventions, so confirming previous studies (Franquesa et al., 2017; Fredrickson et al., 2017). Indeed, experienced meditators chose the pro-environmental choice to a greater extent than naive meditators, regardless of the type of meditation. This suggests that for experienced meditators any meditation may be effective in driving pro-environmental choices.

In contrast, our study provides evidence that LKM is significantly more powerful to drive pro-environmental choices for naive meditators. Given the low number of people who meditate regularly (National Center for Complementary and Integrative Health, 2012), our findings suggest that LKM should be used preferably to expand models of human behaviour more aligned with the challenges of sustainability.

This finding has implications within the educational arena, as it reinforces the argument that the practice of meditation better equips students to develop cognitive abilities, and, more

importantly, to develop their affective and moral domains (Shapiro, Brown, & Astin, 2011; Shapiro et al. 2008). Additionally, the wide heterogeneity of studies, exercises and instruments used by researchers on meditation in education poses a challenge to the operationalization of the practice (Zenner, Herrnleben-Kurz, & Walach, 2014). Thus, the finding that even short meditations based on loving and compassion have a significant effect on the pro-environmental behaviour of learners, may help educators to more effectively introduce the practice of meditation in their courses.

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