

Understanding Sustainability Through Mindfulness: A Systematic Review

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Abstract. The construction industry is central to how the future of humanity will be shaped and can be sustained. Sustainable development and construction is the responsibility not only of researchers, but also all stakeholders involved in the creation and use of the built environment. Despite increasing global awareness on environmental issues, creating a sustainable built environment seems not to be easy. This may be attributed to the gap between the possession of environmental knowledge and environmental awareness, and displaying pro-environmental behavior. It is epitomized by the attitude, “I know I should, but I don’t.”; exemplary, even replacing shorter automobile trips with walking or cycling may cause reduction on environmental impact, driving is the overall tendency of individuals. The characteristic of such an attitude, mindfulness, is ascribed to people who have a relatively greater awareness of the surroundings and of other people. Although mindfulness research has seen exponential growth in the last two decades, a limited number of studies has been adapted towards environmental purposes. This study aims to assess the link between mindfulness and sustainable behavior. In the study, a meta-analytical approach will be adopted, which assumes the conceptualization of mindfulness as a form of behavioral regulation, and the relationship between mindfulness and pro-environmental behavior.

Keywords: Mindfulness sustainability · Pro-environmental behavior
Meta-analysis

1 Introduction

Construction industry’s negative impacts on the environment have been mentioned more than 30 years [1]. In order to limit the harm on nature that construction activities cause, sustainable building approach raised which aims to generate more efficient living areas with consuming and damaging less [2]. On the other hand, users do not always act in buildings as designers projected [3], thus the gap between predicted and actual sustainability performance become inevitable.

Despite the critical role of human behavior in ensuring a sustainable future, there exist individual differences regarding environmental concern. Even though many people are aware of all environmental issues such as air and water pollution, climate change, deforestation and loss of biodiversity, some others still engage in environmentally damaging behaviors. Consequently, increasing attention has been paid to

understanding the impact of human behavior on climate change and environmental decline. It may be claimed that people must change their unsustainable behaviors to protect the environment and sustainability [4]. However, this simple statement disguises the complexity of the constituents which make up individuals' behavior and particularly, an individual's sustainable behavior. In an attempt to explain sustainable behavior, many studies have focused on analyzing the factors that have been found to have influence on sustainable behavior. Along with these studies, several researchers have tended to focus on the effect of psychological factors on human behavior patterns in general and sustainable behavior in particular.

The science of psychology can play an important role in studying human-environment interactions and understanding environmental problems which are rooted in human behavior. These problems can thus be managed by behavioral changes so as to promote environmentally responsible behavior. The psychology of environmental behavior can make a substantial contribution to this change. There has been a growing body of research investigating the psychological underpinnings of behavior that minimize environmental issues [5]. Mindfulness has been viewed as a psychological construct for overcoming behavioral barriers to empower sustainability [6]. Research has also demonstrated the value of mindfulness in behavior change interventions. Eco-psychologists have suggested that mindful awareness of people's interdependence with nature may help us to behave more sustainably [7]. In the context of sustainable behavior, it is reasonable to expect that, mindful individuals are more likely to act more sustainably. This paper discusses the effect of mindfulness on sustainable behavior and search for a path how sustainable architecture can be used as a behavioral regulation tool.

2 Mindfulness and Sustainable Behavior

There has been theoretical and empirical research illustrating the impact of human behavior on nature and indicating the behavioral change as a solution against environmental damage [8, 9]. Several studies have contributed to our understanding of what motivates changes in behavior to minimize environmental issues.

2.1 Mindfulness

In recent years, there has been a growing interest on the construct of mindfulness issues. Its roots go back thousands of years to Buddhist spiritual tradition. The word "mindfulness" originally comes from the Pali word "sati", which means having awareness, attention and remembering [10]. A general definition of mindfulness is a way of paying attention to the present moment, on purpose and without judgment [11, 12]. Several other researchers provided similar definitions of the term mindfulness. Baer [13], for example, defines mindfulness as "the nonjudgmental observation of the ongoing stream of internal and external stimuli as they arise". A common point for these various definitions is that mindfulness is an intentional exclusively on the attentional aspects of mindfulness (e.g., [14]), others follow the model of Bishop et al.

[15], which proposed that mindfulness consist of two components: attention and awareness of experience.

It may be helpful to review questionnaires that have been developed to measure mindfulness. Measurement of the mindfulness construct varies ranging from knowledge based questionnaires [16] to validated questionnaires, such as; Kentucky Inventory of Mindfulness Scale (KIMS), the Cognitive and Affective Mindfulness Scale (CAMS) of Feldman et al. [17], the Freiburg Mindfulness Inventory (FMI) of Buchheld et al. [18] and the Mindfulness Attention Awareness Scale (MAAS) of Brown and Ryan [14]. A detailed review of these different mindfulness inventories to date is beyond the scope of this paper and the reader is referred to Baer et al. [19] and Bergomi et al. [20].

Although a number of self-report questionnaires have been developed to measure mindfulness, the lack of a consensually agreed-upon definition and nature of mindfulness particularly in the cross-cultural setting remain among scholars [21]. This may be attributed to the view that mindfulness appears to be usually difficult to define and conceptualize [14].

2.2 Sustainable Behavior

Although pro-environmental behavior is, in practical terms, synonymous with sustainable behavior, the former has been used to emphasize efforts to protect the natural environment, while the latter specifies actions aimed to protect both the natural and the human (social) environment [22].

Pro-environmental behavior focus on individual's tendency to act in environmentally responsible way and named through different names such as, ecological behavior or environment-friendly behavior [23]. According to Kollmuss and Agyeman [24], pro-environmental behavior is the term used to define a conscious behavior related with natural and built environment that aims to limit adverse effect of human actions. Similarly, Steg and Vlek [8] also defined PEBs through emphasizing their minimized damage on nature and even their contribution to nature.

Pro-environmental behaviors are not only investigated by academic researches but also the governments to motive people to minimize human activities' negative impact on nature. For instance, governmental agencies of Japan, United Kingdom and United States were provided lists of PEBs and total 200 behaviors summarized currently by Kurisu [23].

Many researchers investigated the influential factors of sustainable/pro-environmental behaviors and claimed different behavior models including the relationship of those factors on specific behavior such as; recycling behavior, energy-saving behavior, etc. [23]. Related with those models, questionnaire surveys have also been developed in order to determine the connection with attitude and behavioral tendency. The New Environmental/Ecological Paradigm (NEP) Scale of Dunlap and Van Liere [25], Eco-centric, Anthropocentric and Environmental Apathy Scale of Thompson and Barton [26], Ecological World View Scale of Blaikie [27], Environmental Perception Scale (ENV) of Bogner and Wiseman [28] are some of the measurement methods explained in detail in Kurisu's book [23].

2.3 Relationship Between Mindfulness and Sustainable Behavior

To what extent mindfulness can be correlated to sustainable behavior? It is believed that, mindfulness can make a difference for fostering sustainable behavior. A review of the empirical literature concludes that one's level of mindfulness has an independent and significant relationship with sustainable behavior [29–31]. A few number of studies report that higher level of mindfulness may be associated with lower carbon footprints. Mindful individuals are more apt to pay attention and intentionally process information about environmental impact. Amel et al. [7] found supporting evidence that “acting with mindful awareness was significantly positively correlated with self-reported sustainable behavior”. In addition, Brown and Kasser [32] present additional evidence for the correlation between the level of mindfulness and ecological concern. They found that dispositional mindfulness, along with an intrinsic value orientation, are related to more ecologically responsible behavior. Ericson et al. [33] condemn that mindfulness may promote sustainable behavior. These authors suggest that promoting the practice of mindfulness in schools and organizations may be a key to a more sustainable society.

In 2014, according to their study about hotel guests' behavior, Barber and Deale [34] announced that the level of mindfulness lead individuals make choices which are beneficial for both people and nature. Barbaro and Pickett [6] conducted two studies, reporting that “mindfulness is significantly associated with pro-environmental behaviors” and that mindful traits of observing, non-reactivity and connectedness are particularly important. Jacob et al. [35] reported results of a survey of 821 people, finding significant associations among mindfulness, ecologically sustainable behavior and subjective well-being.

3 Interplay Between Sustainable Buildings and Mindfulness-Based Behavior

Despite increasing focus on mindfulness and sustainable behavior issues, their connection with sustainable buildings is still ambiguous. For example, current literature about mindfulness in journal publications is shown in Fig. 1 [36]. According to American Mindfulness Research Association (AMRA) database, there is a residual trend on mindfulness research since mid-1980s, and an immediate growth of the number of studies about mindfulness, especially for last decade [36].

Considering the increasing research trend about mindfulness, the relationship between mindfulness and sustainable behavior has been mentioned in just few researches seen in Table 1.

However, since it is mentioned at the very beginning of the paper, construction of sustainable buildings is favorable but underpowered target according to environmental deterioration. As it is stated by Wu et al., “We believe that intentionality and mindfulness in the design process of sustainable spaces will bring about intentionality and mindfulness in the thoughts and actions of people using the space” [37]. So, buildings, especially sustainable buildings, should be considered through their occupants' behavioral tendencies and as mediums to shape these tendencies in more sustainable

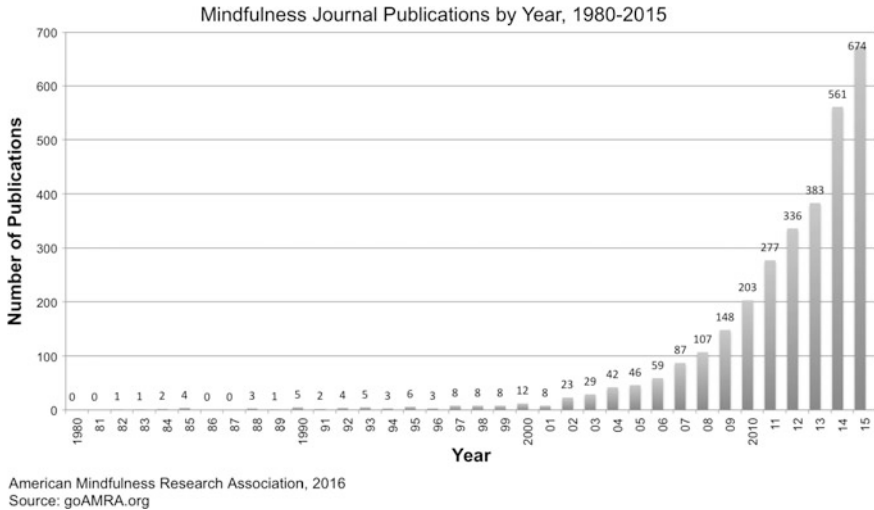


Fig. 1. Mindfulness journal publications by year, 1980-2015 [36]

Table 1. An overview of studies about mindfulness concept into sustainable behavior

Year	Author(s)	Scope of study
1997	Jacob and Brinkerhoff	Effect of mindfulness on sustainable behavior and personal well-being
1999	Brinkerhoff and Jacob	
1999	Jacob and Brinkerhoff	
2005	Brown and Kasser	Ecological concern
2009	Amel et al.	Sustainable behavior
2009	Jacob et al.	
2014	Barber and Deale	Tendency to environmental benefit
2014	Ericson et al.	Well-being and sustainable behavior
2016	Barbaro and Pickett	Mindfulness and pro-environmental behavior

way to ensure the environmentally oriented efforts of construction industry will serve the purpose.

4 Conclusion

User behaviors have non-ignorable role on buildings' actual performance. According to Lockton et al. [3] "The design of products, systems and environments can be used to influence user behavior". However, despite the great effort of creating sustainable built environment especially in last two decades, an important performance gap still exists, due to the environmental concern and behavioral tendencies of buildings' occupants.

Notwithstanding limited studies, mindfulness, as a psychological construct, has become increasingly important in human behavior, especially in sustainable behavior. Application of mindfulness to environmentally responsible behavior can provide sustainability researchers with novel roads of research. This paper aimed to conceptualize mindfulness as a form of behavioral regulation that needs to be investigated in future research within the context of sustainable construction. In other respect, since people are connected with buildings in some way, improvement of mindfulness about sustainability may be achieved by considering architecture as an agent [1]. Thus, construction professionals should focus on designing sustainable buildings by considering them not only as service or products with minimized environmental harm but also as guides for environmentally oriented behavior for users.

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