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# Investigating the Effects of Sensory Cues on Sustainable Decision-Making and Pro-Environmental Purchases

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The subconscious effects of architectural factors on human behavior have rarely been examined. The results of three experiments suggest that subtle auditory, olfactory and tactile stimuli in a built environment affect the decision-making process by means of the mere exposure effect. It is shown that exposure to pleasing sensory cues associated with nature and undesirable cues associated with industrialization leads to an increase in occupants' tendency to act sustainably and to choose pro-environmental consumer products.

## 1. ABSTRACT

Recently, there has been growing literature on the effects of environmental factors on individual's behavior and factors in the built environment that exert subconscious influence on human behavior (e.g., Williams & Bargh, 2008; Ackerman, Nocera & Bargh, 2010; Ulrich, 1984; Dijksterhuis, et. al, 2005, Meyers-Levy & Zhu, 2007; Schnall, Roper & Fessler, 2010; Schnall, 2011). Such factors may, in fact, have a large impact on judgments and decisions because they are often beyond conscious awareness and people typically cannot block out, control, or avoid them (Krishna, 2009, 2012; Wansink & Chandon, 2014). However, there is little research on the role of such factors on pro-environmental judgment and decision-making. Identifying such factors would be crucially important in understanding people's behavior and decision processes in real-world circumstances. Towards this means, the current research project draws on literature in cognitive science, marketing research and architectural studies. Motivated by current research across these fields, we argue that subtle sensory attributes in a physical environment may affect the decision-making process by means of the mere-exposure effect - the phenomenon that exposure to a stimulus affects preference for the stimulus (Zajonc, 1968). Here, it is proposed that individuals exposed to subtle sensory cues associated with sustainability will misattribute perceptual fluency to preference for sustainable products when they are not aware that the fluency is, in fact, the result of exposure to the sensory cues. The empirical research investigates three aspects of sensory environment using auditory, olfactory and tactile stimuli.

In study one, it was hypothesized that being exposed to pleasing natural sounds (e.g., bird's singing), due to a positively-valence association with sustainability is more likely to subconsciously nudge users to choose pro-environmentally compared to pleasing man-made sounds (e.g., Opera vocals) or no sound (control condition). All sounds were pretested for affective valence and associations with nature versus industrialization. Negative natural versus man-made sounds were also studied. It is argued that undesirable sounds associated with industrialization (e.g., construction noises), due to negatively-valenced association with unsustainable behavior, may also promote pro-environmental behavior more than undesirable natural sounds (e.g., annoying animal noises) or no sound. 150 students at a large public university participated in this experiment; 30 participants were randomly assigned to each of the cells in a 2 (valence: positive or negative) x 2 (source of stimuli: natural or man-made) and control condition.

A two-way analysis of variance demonstrated that the average amount of budget allocated to green products was higher for those in the pleasant sound condition ( $M = 12.1$ ,  $SD = 2.8$ ) compared to those in the unpleasant sound condition ( $M = 9.6$ ,  $SD = 2.7$ ;  $F(1, 145) = 4.61$ ,  $p < .05$ ). The main effect of source was non-significant ( $p > .2$ ). However, there was a significant interaction between valence and source  $F(1, 145) = 13.01$ ,  $p < .001$ , indicating that pleasant sounds led to more green purchases when they were natural, and unpleasant sounds led to more green purchases when they were man-made. Two follow-up studies replicated this interaction effect between affective valence and source using olfactory and tactile stimuli.

The main intention of this project is to demonstrate that sustainable behavior is more tightly connected to our physical surrounding than previously thought. Emphasizing subtle environmental attributes in this project will also provide insight into multimodal sensory interaction mechanisms that affect sustainable behavior. By understanding these mechanisms, spaces may be designed favorably to alter the sensory input and thus create an environment conducive of pro-environmental decision-making.

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## 3. AUTHOR BIO

**Sina Esteky** is a multidisciplinary researcher with expertise in design research and consumer research. He has spent time as a practicing architect, an economic consultant, an autism scholar, and most recently as a researcher and doctoral student in both Architecture and Business Administration at the University of Michigan. He received a M.Sc. in Architecture with a minor in psychology from the University of Michigan in 2011 and a B.Sc. in Architectural Engineering in 2009.

Sina's work mainly focuses on the influences of architectural design on consumer behavior. On a broader horizon, he is interested in studying how contextual and sensory factors influence human perception, cognition, judgment and decision-making.