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Let the sun shine! Measuring explicit and implicit preference for environments differing in naturalness, weather type and brightness

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ABSTRACT

Exposure to natural environments and daylight often coincides. From an evolutionary perspective on preference, both should be highly preferred as they were important components for survival. Furthermore, research has indicated that people generally have positive connotations with both daylight and nature. However, these two phenomena have mostly been studied separate from each other in two different research fields. In this article we present three studies in which effects of naturalness and daylight characteristics on preference are studied simultaneously. We investigated both explicit and implicit preference, using direct ratings of the scenes and an affective priming task, respectively. The scenes were manipulated across three dimensions; naturalness (nature vs. urban), brightness (light vs. dark), and weather type (sunny vs. overcast). Consistently, we found explicit preferences for natural, bright, and sunny scenes. In contrast, no evidence was found for an implicit preference for nature, brightness, or sunlight.

1. Introduction

Daylight and greenery are both highly valued – and salutogenic – elements of nature. In daily life, exposure to natural environments often coincides with exposure to daylight, whether it is in images or videos or while actually being outdoors in nature. To all of us gardeners, bird watchers, and hikers this offers a clear win–win situation. Yet from a research perspective such concurrent exposure opens the door to confounds if we want to learn about the independent contribution of each of these elements. Interestingly, both elements have been intensively studied with respect to their actual or expected potential for resource replenishment (restoration, vitalization) and health, and with respect to individuals' preference for them. However, very little research has focused on investigating preference for view type and daylight characteristics (for instance brightness and weather type) simultaneously, while much can be said in favor of studying them together. Apart from their frequent co-occurrence, both are an important part of our natural world in which we have evolved and literature suggests that both exhibit very similar restorative effects (Beute & de Kort, 2013). Furthermore, the presence of one element may influence the appraisal of the other, as neighborhood scenes are appraised differently under day and nighttime conditions (Hanyu, 1997, 2000), daylight characteristics such as the amount of shadows could potentially affect preference ratings of environmental scenes (Ulrich, 2008), and the use of lighting directed towards natural elements during nighttime can influence perceived restoration as well as preference ratings (Nikunen & Korpela, 2009, 2012). In the paper presented here, we therefore studied the effects of nature, weather type, and brightness on preference ratings simultaneously. Manipulating characteristics objectively allowed us to investigate their independent contributions and how differences in one phenomenon influence preference ratings of the other. Furthermore, we considered preferences measured both on an explicit and implicit level.

Several viewpoints on the development and functionality of preferences exist. Some scholars view preferences from an evolutionary perspective, claiming that preferences serve adaptive needs (e.g., Kaplan, 1992b; Ulrich, 1983). Others pose that preferences are more likely to be learned and culturally based (e.g., Tuan, 1974). However, irrespective of whether preference is in our DNA or learned, preference is often assumed to (at least partly) have a functional origin and is therefore believed to reflect the restorative potential of environments (Van den Berg, Koole, & van der Wulp, 2003). First, we will discuss the relevant literature on the nature, basis and meaning of preference followed by a short overview of the empirical evidence of restorative effects of nature and daylight.

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1.1. Evolutionary, cultural, and learned bases of preference

From an evolutionary point of view, human emotion, behavior, and cognition have adapted to the past environments we lived in (Tooby & Cosmides, 1990). Environmental preference influences subsequent affect, behavior, and cognition (Ulrich, 1983) as well as knowledge acquisition (Kaplan, 1992b). Throughout human history, preferences for certain environments may have served adaptive needs by inducing approach or avoidance, thus guiding human beings towards healthy environments and away from unsuitable environments (Kaplan, 1987; Ulrich, 1983). For instance, humans have evolved in natural environments, subject to the cycles of day and night. For thousands of years, man learned to be active during the – relatively safe – day and rest and seek shelter during the dangerous, dark night. Light, therefore, also has evolutionary relevance and Ulrich (2008) argues that under certain circumstances, positive responses to nature may be enhanced by daylight. For instance, a sunny and well-lit environment signals less danger than an overcast environment or an environment with many shadows (Ulrich, 2008). Numerous physiological rhythms in our body have evolved based on this diurnal cycle (Millar-Craig, Bishop, & Raftery, 1978; Rea, Bierman, Figueiro, & Bullough, 2008; Rüger & Scheer, 2009). In fact, rhythms not only encompass diurnal cycles, but also seasonal ones related to the earth's solstice. These rhythms are engrained in our bodily make-up and DNA. The same can be said for environment type, as humans have evolved in natural – as opposed to urban – environments. It has been suggested that because humans have evolved with these natural environments, and diurnal and seasonal cycles, they are also preferred (Wohlwill, 1983).

Some state that environmental preferences are formed immediately based on the composition of a scene, like the presence of certain "preferenda" (Zajonc, 1980). Preferenda are features in an environment that can cause an affective response even without paying conscious attention to it. Examples of these features are for instance water elements and deflected vistas (Ulrich, 1983). Research has indicated that certain more global attributes of our environments as for instance refuge (Appleton, 1975, 1992), legibility (Kaplan, 1992a, Ulrich, 1983), and complexity (Kaplan, 1992a) influence preference. Preference judgments have also been proposed to rely on more cognitive processes comparable to decision making (Kaplan, 1992b), of which the outcome is based on a complex calculation of taking into account and weighing various attributes. Kaplan and Kaplan (1989) proposed an information-processing framework, the central premise of which is that environments that facilitate understanding and exploring are preferred over environments that do not fulfill human's basic hunger for knowledge (Knopf, 1987).

If preferences have an evolutionary basis, then these judgments should be universal. Indeed, research has indicated that people generally and consistently prefer natural over urban environments (see e.g., Hartig & Evans, 1993; Ulrich, 1983). Furthermore it is postulated that these effects can occur very rapidly and automatically. Evidence for preference of natural over urban environments has been found on a pre-cognitive level in a series of experiments Hietanen, Korpela and colleagues (Hietanen & Korpela, 2004; Hietanen, Klemetillä, Kettunen, & Korpela, 2007; Korpela, Klemetillä, & Hietanen, 2002). They employed an affective priming paradigm, in which pictures of natural or urban environments were followed by either emotional vocal expressions or emotional facial expressions. The affective priming paradigm dictates that if natural environments initiate positive affect pre-cognitively, this should facilitate recognition of subsequent positive emotional stimuli because this response is congruent with their response to the natural environment. Conversely, recognition of negative stimuli after viewing a natural picture should become slower because this category is incongruent with their response to the natural environment. Indeed, they found different facilitation effects between natural and urban environments. Interestingly, an automatic affective response to blue light has also been suggested, based on brain imaging studies showing a very rapid activation of the hippocampus and amygdale after exposure to blue light (VandeWalle, Maquet, & Dijk, 2009; Vandewalle et al., 2010).

Yet in spite of indications that preferences may be partly encoded in our genes and/or neurological makeup, preferences also appear to be influenced by the personal experiences that people have had with certain environments and the values that society places on these environments. Within this framework a universal preference for natural over urban environments is contradicted by for instance pointing at the changing values of nature, which over the past centuries have ranged from being a place of evil to being a sanctuary (see: Knopf, 1987). In this respect, sunshine might also have very different connotations for people living at high latitudes than for people living in a more Mediterranean climate. Furthermore, it has been postulated that childhood experiences play an important role in the formation of values of environments (Tuan, 1977).

Esthetic judgments – often viewed as an important part of preferences – have also been found to rely on evolutionary based influences (Berlyne, 1971) that can subsequently be affected or even changed by cultural influences (Jacobsen, 2010; Tomasello, 2000). One well-known biologically determined esthetic liking is our preference for symmetry (Jacobsen, Schubotz, Höfel, & Cramon, 2005). Furthermore, factors as for instance the persons' affective state have been found to influence esthetic judgments as well (Konecni, 1979). Jacobsen (2010) suggests that esthetic judgments are a complex interplay between the stimulus, the person, and the situation. Similarly, research has indicated that besides culturally and individually based differences preference for certain environments can differ within a person, based on motivational needs. Indeed, a higher need for restoration results in higher preference for natural environments (Hartig & Staats, 2006; Staats, van Gemerden, & Hartig, 2010). Porteous (1996) has further postulated that people base their preference judgment on the beliefs they possess on how the environment affects their health and wellbeing. From this perspective, it is not the evolutionary relevance of natural environments and natural light that would influence preference, but the values that people themselves have given to these two entities. For instance, research has indicated that people generally believe that natural light is better for health, performance, and mood (Veitch & Gifford, 1993; Veitch, Hine, & Gifford, 1993), and brightness (as opposed to darkness) is often associated with good (vs. bad; Lakens, Semin, & Foroni, 2012; Meier, Robinson, Crawford, & Ahlvers, 2007). People also often use weather type as a cue for their mood, with sunshine related to a more positive mood (Messner & Wanke, 2011; Schwarz & Clore, 1983). Similarly, natural environments are viewed as places for cognitive freedom and escape (Gifford, 2002; Kaplan, 1995). More generally speaking, evidence has been found for a certain 'naturalness bias' (Rozin, 2005) meaning that natural products are preferred over synthetically produced products even when they are exactly the same at a molecular level. In conclusion, preferences may have evolutionary, learned, cultural, and motivational bases.

1.2. Preference and restorative potential

Irrespective of the basis of preferences, evidence has been found that preference is related to the restorative potential of environments for human beings. In other words, environments that foster mental and physical health will be preferred over environments that are detrimental for mental and physical health. In accordance to this, a consistent link between explicit preference –