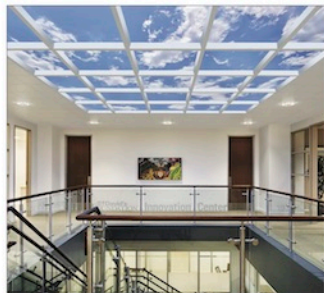


THE RESTORATIVE IMPACT OF PERCEIVED OPEN SPACE

COGNITIVE BIOPHILIA TO ENHANCE THE PATIENT EXPERIENCE



BEYOND POSITIVE DISTRACTION 1

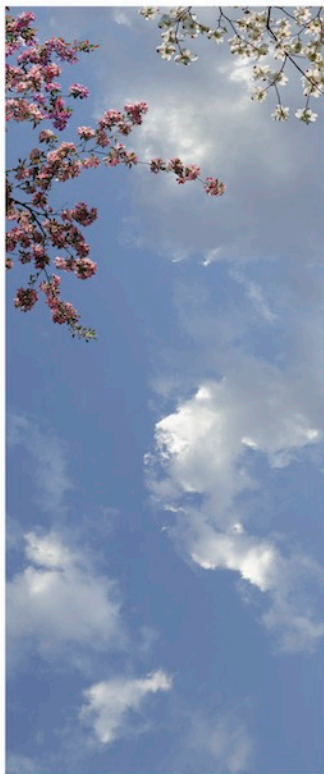
Nature imagery has been studied extensively in healthcare environments and is recognized for its ability to elicit a positive distraction in captive populations. However, its therapeutic role has been limited to its representational or symbolic value.

NATURE IMAGERY AS A MULTISENSORY WINDOW 2

This paper explores multisensory imagery set within a virtual skylight framework. Such installations deliver deeper restorative benefits because they alter the observer's perception of space. Optical illusions set within an architectural setting engage the cerebellum, often involved in spatial cognition. By engaging a part of the brain involved in depth perception, fMRI research shows that multisensory imagery induces an experience of perceived vastness in the observer, even in enclosed interiors.

THE HEALING BENEFITS OF PERCEIVED OPEN SPACE 3

A neurobiological understanding of the malleability of cognitive perception in enclosed interiors reveals a new design framework for healthcare designers. No longer beholden to the various limitations of structural space in deep plan buildings—which include a significant number of urban hospitals—designers can create perceived open space. These illusory skylights to open skies alter the experience of patients and clinical staff, often captive in isolated treatment rooms, pre-op and post-op areas, and other clinical spaces.



4 CONTEXTUAL CUES AS REDESIGN TOOLS

This paper cites a number of neurobiology and environmental psychology studies indicating that environmental context plays a role in modulating visual cortex signal strength, which when architecturally staged conjures a visceral experience of vastness. New studies also indicate that our memory stores spatial reference frames—spatial relationships that map out our sense of space—which can be tapped at a neural level to create perceived open space in interiors otherwise isolated from natural surroundings.

5 HEALING INTERIORS WITH SPATIAL POLARITY

This new design framework introduces two essential spatial relationships: the perceived zenith, and the perceived horizon line, which serve as the restorative barometer of spatial cognition. By connecting isolated spaces with perceived openings to nature, our body schema, which is the neural representation of the body, automatically extends into the physical environment, rather than retracts from it. Since our body schema is malleable and responds to environmental cues, multisensory imagery is able to recreate the hallmark of aesthetic architectural design: spaces that offer spatial polarity or feature Prospect & Refuge, panoramic vistas from a place of comfort and safety.

6 VIABLE COGNITIVE TECHNOLOGY

Given the predicted urban growth, hospitals are pressured to serve high density populations in larger buildings. And these, by design, include areas of enclosed interiors that hamper human wellness. However, generating perceived open space provides a viable, cognitive technology to redress conventional building design.

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HEALTH ENVIRONMENTS RESEARCH & DESIGN JOURNAL

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NEURAL CORRELATES OF NATURE STIMULI: AN fMRI STUDY

Texas Tech University's 2014 pioneering study in neuroarchitecture, explored the impact of multisensory Open Sky Compositions using brain imaging technology. Analysis of the brain maps indicated deliberately designed Open Sky Compositions shared all of the characteristic neural activations of standard positive nature images while activating several other unique brain regions; of particular interest were those found in the cerebellum.

Pell, D., O'Boyle, M., Amor, C., Hsu, L., Valpou, S., & Fiang, D. (2014). Neural Correlates of Nature Stimuli: An fMRI Study. *Health Environments Research & Design Journal*, 7(2), 9-28.



THE IMPACT OF OPEN SKY COMPOSITIONS ON PATIENTS:

In 2016, Texas Tech University published a second study that examined the impact of multisensory Open Sky Compositions on acute stress and anxiety in a medical-surgical inpatient unit at Covenant Health Hospital in Lubbock, TX. The single blind study found a difference in Acute Stress by more than half (53.40%) and a difference in Anxiety by more than a third (34.79%) in patients assigned to experimental rooms where the architecturally staged illusions of sky were installed.

Pell, D., Freese, P., O'Boyle, M., Amor, C., & Valpou, S. (2016). The Impact of Simulated Nature on Patient Outcomes: A Study of Photographic Sky Compositions. *Health Environments Research & Design Journal*, 9(2), 38-51.

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