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PRESENTER ABSTRACTS

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fMRI Study of Architecturally-Induced Contemplative States

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Within the context of contemporary neuroscience and clinical research in meditation, this pilot study uses fMRI scans to gauge and compare the neurophenomenological response that contemplative and ordinary buildings elicit from 12 subjects. The result indicates not only that there are clearly different reactions to the two types of built environments but also, and more significantly, that the phenomenological and neural correlates of the architecturally-induced contemplation share many similarities with internally-generated meditation while displaying important differences that have more in common with peak/flow/aesthetic psychosomatic states than with meditative conditions

1. EXTENDED ABSTRACT

This interdisciplinary investigation tests whether the perception of environments designed for contemplation elicit brain activations similar to those found under contemplative states. If architecture is shown to be an effective 'external method' to facilitate contemplation, then the beneficial effects of internally-driven contemplative practices (e.g., prayer, meditation) shown by recent neuroscience and clinical research [1] could be extended to long term exposure to buildings designed for that purpose. In this sense, this effort addresses a missing dimension in today's contemplative neuroscience that focuses overwhelmingly on meditative experiences gained through internally-induced (self-directed) methods, while also helping to construct an empirical foundation for evidence-based design. Our long-term goal is to investigate cognitive, emotional, and health effects of contemplative/sacred architecture on the wider population.

In order to test the hypothesis that buildings designed for contemplation elicit neuro-signatures associated with meditative states, we devised a pilot project combining a functional Magnetic Resonance Imaging (fMRI) based experiment and current neuroscience literature on meditative states. We recruited 12 architects and asked them to view images of ordinary buildings ('Control' Block = school, office, house, etc.) and contemplation-inducing ('Experimental' Block = temple, retreat, church, etc.) edifices while their brains were being scanned. A building was depicted through 4 images at 20 seconds each (totaling 80 sec) separated from the next set by a 40 sec recovery period (gray plate). Each Block started with a Baseline period in which a gray color plate was presented for 60 sec. There was a short questionnaire after each Block and a 20-minute Exit Interview intended to collect behavioral/psychological data. A second Control came from the published record of neuroscience research on meditation-related practices.[2]

Our data, based on regression analyses and activation contrasts between Control and Experiment in coordination with psycho-behavioral responses, show that contemplative buildings (a) induce markedly distinct phenomenological states and neural activations than ordinary buildings (measurable in the differential engagement of the Whole Brain, Frontal Lobe, Orbitofrontal Cortex, Inferior Parietal Lobule, Insula, and Cingulate Gyrus); (b) allow subjects to enter into a meditative state with diminishing levels of anxiety and mind wandering ; and (c) activate subjects' cortical regions of sensory-motor and emotional integration, non-judgementality, and embodiment. Additionally, we found that depth of contemplative experience was correlated with the deactivation of major cerebral regions, noticeably the Prefrontal Cortex. This indicates that while the phenomenological and neural correlates of the architecturally-induced contemplation share some similarities with internally-generated meditation (particularly of the Open Monitoring type), they also exhibit considerable differences that find better correspondence with peak/flow psycho-somatic states and profound aesthetic experiences.[3]

This research project (a) extends our understanding of alternative means to foster contemplation at an individual and collective scale; (b) opens new avenues of investigation in neuroscience; (c) advances the scientific investigation of architecture (contemplative and otherwise); and (d) provides an empirical foundation for the impacts of centuries' old architectural traditions on human phenomenology.

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Julio Bermudez, Ph.D., is Associate Professor at The Catholic University of America School of Architecture and Planning where he directs the Sacred Space and Cultural Studies graduate program. Bermudez's research focuses on architectural phenomenology and the relationship between architecture and spirituality. He has lectured, led symposia, and published articles in these areas nationally and internationally. His book "Transcending Architecture. Contemporary Views on Sacred Space" (published by CUA Press) will be released in January 2015. Dr. Bermudez co-founded the Forum for Architecture, Culture and Spirituality in 2007 (www.acsforum.org).

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