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PRESENTER ABSTRACTS

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An fMRI-Based Exploration of Neural Correlates of the 'Formal' Environmental Attributes of Healthcare Settings

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This study explores neural activation in adult brains in response to visual stimulus containing formal environmental attributes. This study focuses on emotional impact of visual stimuli, and bridges the evidence between environmental psychology and neuroscience, to identify specific visual properties that elicit emotional responses. This study investigates a particular visual property "contours" and explores it within the theoretical paradigm of neuro-architecture to generate specific hypotheses for architecture and neuroscience.

1. EXTENDED ABSTRACT

The aim of this study was to explore brain activation in response to visual stimuli containing formal environmental attributes. Architecture relies on visual stimuli to conceive, design, present, and even experience built environments. Currently, very little is known regarding the impact of these formal environmental attributes on human perception and cognition, much less their subsequent impact on behavior. More specifically, little is known regarding the relationship between a primary attribute of the physical environment – e.g., contours – and neural activations.

Contours represent one of the fundamental environmental attributes relating to form – a major decision taken by designers of the physical environment. How does the human brain react to different contours? The focus of this study was on the "rapid" initial, arguably pre-cognitive responses that may shape the emotional affordance of an environment. Bar and Neta (2007) conducted a preference study on everyday objects with curved or sharp edges and found that respondents preferred objects with a curved contour compared with objects that have pointed features and a sharp-angled contour. This bias was hypothesized to stem from an implicit perception of potential threat conveyed by sharp features. Human neuroimaging was used in a second study to test this hypothesis, and it was found that the amygdala was significantly more active for sharp objects compared with their curved contour counterparts.

Our study extends Bar and Neta (2007) by exploring the potential influence of the contour information of meaningful healthcare settings on amygdala activation. Thirty six subjects were exposed to four classes of images (exteriors, interiors, objects, and landscapes), in three contour types (sharp, curved, and balanced). The images were presented to subjects while in a 3T fMRI scanner and the magnitude of activation of the amygdala to each image type was compared. Amygdala activation while viewing objects and landscapes confirmed the Bar and Neta (2007) findings – sharp contours were associated with significantly higher activation. However, the pattern was reversed in the case of built forms (exteriors and interiors) – a finding of substantial importance to healthcare design. This session will present the methodology and findings, and offer some plausible hypotheses to explain the reversal.

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Hessam Ghamari: Hessam Ghamari serves as a Teaching/Research assistant in the Department of Design at Texas Tech University, where he is pursuing a PhD with emphasis on healthcare design. His doctoral dissertation focuses on the importance of wayfinding in u. In 2013, he was awarded the "Best Student of the Year" in the college of Human Sciences at Texas Tech University. He has published numerous articles in journals and international conferences on environment psychology, evidence based design, and healthcare design.