

Useful Level of Explanation: Understanding Connections between the Brain, Behavior, and the Built Environment

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I. EXTENDED ABSTRACT

The importance of studying human behavior in context in the real world cannot be overstated. Kurt Lewin's field theory (1946) proposed that behavior is a function of both the individual and its environment $B = f(P, E)$, and strived to apply psychological knowledge to solve real-world social problems. Since the 1960s, environmental psychologists and other behavioral scientists have collaborated with design professionals (e.g., Environmental Design Research Association) in an effort to understand how people respond to their everyday physical environment and to apply their knowledge in the design of the built environment that would satisfy the users' needs (i.e., human-centered design). More recently, the explosion of neuroscience research and the development of new measurement techniques, such as fMRI, have expanded the methods, and consequently the types of questions that can be asked, regarding the brain bases of behavior as it relates to the individual and its environment.

Architects are increasingly asked by clients to provide evidence-based designs. We argue that the best approach to understanding the relationship between the brain, behavior and environment is to use a level of explanation that is appropriate, useful and predictive for the specific phenomenon at hand. In many cases, the most useful level of explanation is behavioral; that is, with our current understanding and methodologies additional useful insight could not be gained from molecular, cellular or systems level investigations. Basic research that seeks to understand the connections between the brain and behavior and cognition is nonetheless valuable in its own right.

We seek to provoke the ANFA community through constructive discussion about practical approaches to applying scientific knowledge among the design professions. We will review the historical development of environment-behavior research and the neuroscience for architecture movement. We will discuss why and how neuroscience and psychology can contribute to our understanding of people's interaction with their everyday built environment. Considering the impact that the built environment can have on our well-being and the educational focus of the design professions, we believe that applied research is immediately relevant to the design process but less pursued and we urge researchers to collaborate with design professionals to identify key research directions.

2. REFERENCES

Environmental Design Research Association (<http://www.edra.org>)

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3. AUTHOR BIO

Margaret Tarampi Ph.D. Assoc. AIA is Post-doctoral Researcher at the Center for Spatial Studies, University of California Santa Barbara (UCSB). Previously, she was a Junior Research Fellow in the SAGE Center for the Study of the Mind at UCSB and a postdoctoral researcher working with Mary Hegarty in the UCSB Department of Psychological & Brain Sciences. She received her Ph.D. in Cognitive Psychology from University of Utah. Her interdisciplinary research investigates the cognitive and neural mechanisms that underlie space perception and spatial cognition in select populations including individuals with visual impairments and spatial experts such as dancers and architects. Other research interests include spatial thinking, perception and action, perspective taking, joint action and kinesthetic imagery.

Prior to her current research work, Margaret was already developing a unique background that was truly interdisciplinary. She graduated from Carnegie Mellon University with a Bachelor of Architecture and minors in Psychology and Architectural History. Her interests in the effect of architecture on quality of life issues brought her to the American Institute of Architects in Washington DC, then the Academy of Neuroscience for Architecture in San Diego CA and the Salk Institute for Biological Studies in La Jolla CA.

Cheuk Fan Ng, Ph.D. is Professor of Psychology at Athabasca University, Canada's Open University. She received her graduate degrees in psychology with a focus in environmental psychology from the University of Victoria in Canada. Prior to that, she studied and worked in the real estate appraisal field for the Government of Hong Kong for five years.

Cheuk Ng's research projects and interests have revolved around noise, crowding, and privacy in the workplace and in housing, immigrants' use of space and acculturation, retail environments and telework. She is a regular reviewer for the *Journal of Environmental Psychology* and was the Section Chair and newsletter editor of the Environmental Psychology Section of the Canadian Psychological Association for several years. Also, she is on the Expert Review Committee of the Council on Tall Buildings and Urban Habitat, based in Illinois. She is a member of and has presented at the Environmental Design Research Association, American Psychological Association, and Canadian Psychological Association.