

The influence of visual perception on responses towards a real-world environment and application towards design

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When it comes to built environments, architects often make bold statements about user responses and behaviors that will occur within their designs, but design choices are often made solely by the designer's intuition. Neuroscientific research implicates posterior cortical networks in processing the layout of built-environments thus suggesting that visual perception drives responses to built environments. Thus the goals of the current study - conducted in collaboration with *Stantec Architecture Ltd.* - were threefold: 1) To examine the relationship between design intent and the realized space, 2) To develop a closer understanding of how visual perception of the physical features of space influences behavior and experience and 3) To examine ways in which such relationships can be used during the design process to create a more successful building. Here the properties of the environment were described through the use of both visibility graph analysis and isovist analysis as these metrics allow for accurate descriptions of large environments as well as viewer-based descriptions of space. Post-occupancy evaluation was conducted within the *University of Toronto: Scarborough Student Centre*, including questionnaires, user mapping exercises, and both entry/destination path and location-based behavior observations. Such data allowed for the examination of a) whether the architect's stated design intent was achieved and b) the relationship between visual properties of the environment and experience.

The results demonstrated that although experienced designers can create spaces which foster desired behaviors, there are situations in which their intuition can result in spaces which do not perform as predicted. Furthermore, it appears that navigation behavior and responses towards particular spaces are influenced by visual perception, primarily by the physical properties of the space as captured by visibility graph integration and isovist properties. Social cues and memory factors, as captured by the presence of others and previous usage of the building, may additionally influence responses. By elucidating the complex relationships between the visual perception of space and the behaviors and responses to built environments, the findings here could provide designers with better tools to more fully realize their design intent and to create buildings which are better aligned with their user's needs

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Vedran Dzebic is Master of Arts Candidate in the Cognitive Neuroscience Division, Psychology at the University of Waterloo and a member of the Research Laboratory for Virtual Environments. His research focuses on exploring the ways in which the physical properties of built spaces shape experience of space and navigation behavior. He plans on continuing to explore these relationships during his PhD studies.

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Justin S. Perdue, M.Arch, OAA, MRAIC is a licensed architect who practices at Stantec Architecture Ltd., in Toronto, Ontario, Canada. His architectural work primarily focuses on higher-education and corporate office environments. He is a graduate of the University of Waterloo's School of Architecture, and has long been interested in the connection between architecture and the fields of environmental psychology and neuroscience.

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Dr. Colin Ellard is a research psychologist and director of the Research Laboratory for Virtual Environments at the University of Waterloo. His main interest is in using the methods of experimental psychology, simulation, and psychophysiological methods to explore the relationship between design and experience with a particular focus on the emotional response to built space.