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PRESENTER ABSTRACTS

ACADEMY OF NEUROSCIENCE FOR ARCHITECTURE

The Psychology of Architectural and Urban Design: Sensor-Based Field Methods Based on Guided Walks

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New tools using smart phones and simple non-invasive sensors provide opportunities for the exploration of person-place interactions in field settings In several experiments employing such tools, we have explored the physiological and emotional reactions of participants walking through the urban scale built environments in several different types of cityscapes. Our main findings suggest that both collative variables such as complexity and more molar elements of urban design such as views of nature and façade permeability exert considerable influence on both our state of arousal and our affective reactions to place. We conclude that field-based methods using such tools provide a powerful method by which built designs can be assessed for psychological impact.

1. EXTENDED ABSTRACT

The advent of new types of tools for exploring person-place interactions at deep biological scale presents many opportunities to advance theory in areas of environmental psychology closely allied with neuroscience. These tools can also provide powerful new applied methods for enhancing the fit between built settings and human biology and brain function. In the Urban Realities Laboratory at the University of Waterloo, we have been developing a set of tools that can be applied to a wide range of design problems at a scale extending from building interiors (Dzebic & Ellard, 2013) to urban streetscapes (Ellard & Montgomery, 2013). These tools include both location-aware smart phone applications that can be used to poll an observer's psychological state by means of a battery of self-assessment questions, and physiological instruments that can record geo-tagged indices of arousal and engagement such as heart rate, skin conductance, EEG and patterns of eye movements. In our presentation, we will illustrate the power of this approach by means of several case examples in which participants were led on guided walks through urban settings in Waterloo, New York City, Berlin and Mumbai. The walks were designed in such a way as to explore the influence on human response of collative environmental properties such as complexity and mystery, and also to assess the impact of commonly considered elements of urban design such as views of nature and façade permeability. Views of nature produce decreased levels of arousal and increased levels of positive affect even when such views are fragmentary and when they are embedded within greater contexts that might be expected to produce negative associations (cemeteries and hospital grounds). Closed facades containing low levels of complexity and activity produce low levels of arousal and negative affect, whereas open facades with higher levels of complexity and activity produce higher levels of arousal and of positive affect. Generally, increased complexity appears to be associated with higher arousal and positive affect. Interestingly, in some cases the response to the appearance of a built setting is mitigated by a participant's familiarity with the narrative of a setting. Specifically, visitors seeing a setting for the first time show responses that differ from those who have long familiarity with a setting. Overall, our findings suggest that many of these variables, even in a complicated and dynamic field setting, exert an influence on preference and emotional state and also have a profound impact on physiological response. We will argue that an integrated approach, based on ecologically valid field methods, can not only bolster laboratory findings from simulated environments (Valtchanov et al., 2010), but can also offer a useful approach to practical problem-solving in architectural design.

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3. AUTHOR BIOS

Colin Ellard: The presenting author is a cognitive neuroscientist in the Psychology Department at the University of Waterloo and director of its Urban Realities Laboratory, which employs a combination of field methods and laboratory methods using immersive virtual reality to problems and questions in environmental and architectural design.

Vedran Dzebic: The second author is a senior graduate student in the Urban Realities Laboratory with expertise in field methods in architectural psychology and the use of immersive simulations. Dzebic was a presenter at ANFA 2012 and his work was subsequently selected for publication in Intelligent Buildings International.