Investigating Stress Triggers and the Built Environment

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I. EXTENDED ABSTRACT

The physical environment influences mental healthI and inevitably well-being. While exposure to natural environments shows salubrious health benefits among those who maintain a consistent connection,[2-8] little is known about how urban environments impact mental health. As urbanization increases worldwide, it is essential to understand the linkages between urbanized environments and public health. This project is guided by the research question: How do different environmental characteristics affect stress-related responses in users?

The study will guide individual subjects (n > 30) to walk a designated route, exposing them to different architectural and environmental elements in downtown Manhattan, Kansas. Physiological biofeedback sensors, including electrodermal activity (EDA) and heart rate sensors, will be used monitor physiological behavioral changes[9-11]; GPS will provide spatial location; and a GoPro camera will provide real-time first-person experience. Data from these sensors will be integrated into a temporal-spatial analysis to ascertain correlations between architectural and environmental elements in space and associated stress responses. Upon completing the walk, participants will take a brief survey asking for their perceptions, both quantitatively and qualitatively, of the different environments they encounter on the walk.

Raw data collected from the biofeedback devices will be refined and analyzed spatially using GIS mapping software. This will allow us to visualize any associations between design characteristics and the elicited behavioral responses in order to determine the environmental characteristics that may illicit heightened stress responses. Analysis of the survey data will seek to identify any correlations between physiological and perception-based responses.

The intent of the research is to provide a foundation for further studies into how public policy can be better informed and augmented to mitigate potential public health issues caused by urban design. Results will also inform architectural and engineering decision-making processes to further improve urban design by identifying characteristics that may improve or decrease mental health of those living and/or frequenting urban environments.

2. REFERENCES

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3. AUTHOR BIOS

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Parker Ruskamp is a graduate student studying landscape architecture at Kansas State University. His focused interests include placemaking, resiliency in design, and the integration of cultural influences into the design process. Investigating Stress Triggers and Characteristics of the Built Environment was his first foray into independent research. By studying the relationships between psychophysiology and the built environment, he set out to gain a greater understanding of what drove personal perceptions and responses to different environments and how design plays a factor in human preference.

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Brent Chamberlain joined K-State in 2013 as an Assistant Professor. His research spans a variety of topics, focusing mainly on developing geospatial and geovisualization tools and information to conduct spatial science and improve spatial planning through more informed knowledge. His publications span a variety of topic areas, including: applied artificial intelligence techniques, environmental psychology, spatial planning, wastewater management, forest planning (and aesthetics), forest conservation mapping (Brazil), highway design and driver experience, and ecosystem service-oriented decisionmaking. He was previously a Postdoctoral Fellow at the Institute for Resources, Environment and Sustainability at the University of British Columbia (UBC).

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Bob Condia, AIA, is an architect and design partner with Condia+Ornelas Architects, Manhattan, KS. A professor of architecture at Kansas State, he teaches architecture as an art form with due considerations to: neuroscience and architecture; the real; the ancient works of man; a building's terrestrial and celestial alignments; metaphysics and poetics of architectural design. He has been a studio critic for 30 years in both architecture and interior design. In 2008 he received the Commerce Bank Distinguished Undergraduate Teaching Award and in 2015 AIAKansas' Schirmer Award for service. His publications range from monographs on the works of progressive architects to theoretical articles on the experience of space as well as a catalogue of his own surrealist illustrations. Of particular attention are his recent work on neuroscience and architecture, the biological basis of aesthetic experience, and the craft of teaching architects to teach.