Curiosity as a Design Tool

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1. EXTENDED ABSTRACT

1.1. Research Goals

Curiosity is a basic element of our cognition[1] and a powerful drive influencing human exploration. Our research proposes to harness design heuristics for the purpose of amplifying curiosity in the general population with the ultimate goal of developing designs promoting curiosity to improve human cognitive and general wellbeing. Studies have highlighted that people are better at learning information they are more curious towards, as well as learning incidental information while in curious states.[2] This research program is aimed at potentiating cognitive improvement in users via architectural designs informed by neuroscience. Specifically, our study will evaluate methods of employing curiosity to open a cognitive reception window, laying the groundwork for its use towards enhancing cognition.

1.2. Methodology

A methodology for designing with curiosity in mind should lead to further research as to the possible benefits of curiosity evoking environments. The implied potential in an architectural context is the development of Evidence Based Design methods to improve spaces such as learning facilities. The study aims to provide an easily replicable approach for future research that can yield empirical results from which to extract implications for design. In order to evaluate the ability of design elements to arouse curiosity we will use behavioural paradigms, as well as eye tracking (ET) and wireless electroencephalography (EEG) to directly correlate the visual focus and neuronal activity of a subject.

1.3. Interim Results

We measured the Response Time (RT) to a series of simple binary decisions regarding the shape characteristics of letters in the center of a screen, whilst visual distractors (shapes and images of objects) appeared in the peripheral vision. RT for each letter presented was recorded and associated to the specific accompanying distractor (if one appeared). The extent to which a subject has decided to allocate visual attention to the distractor at the cost of success in the task is represented by RT. On this premise, distractors were expected to produce different response times.

Our preliminary results show differences in average response times, which suggest that some distractors are more curiosity evoking than others and that we can isolate this phenomenon in order to evaluate the eyemovements and neural activity associated with heightened curiosity. A further analysis of RT will inform the nature of future sets of distractors in order to test the designability of curiosity evoking visuals.

1.4. Future Steps

Identifying the hallmarks of curiosity through ET and EEG: Eye movements have been shown to indicate epistemic curiosity states.[3] Our next step is to employ ET to confirm that response time variations associated with heightened curiosity correlate with saccades from task to distractors. Additionally, we will use EEG with the "most curious" and the "least curious" distractors in order to identify specific components/patterns of brain activity hallmarking curiosity in the brain.

1.1. Project Impact

Outcomes from our study will facilitate the development of curiosity metrics and their application in the design of built environments, creating neuroscientifically informed architecture. Such an approach can be adopted with immense benefits for society by improving learning in schools, memory and cognitive enhancement in retirement communities, and rehabilitation facilities.

2. REFERENCES

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3. AUTHOR BIO

Professor Moshe Bar, Ph.D. is a Director of the Gonda Multidisciplinary Brain Research Center and the head of the Cognitive Neuroscience Lab at BarIlan University, Israel where he returned after 13 years at Harvard University. He is also an associate professor in Neuroscience and Psychiatry at Massachusetts General Hospital and Harvard Medical School. Prof. Bar is an internationally recognized cognitive neuroscientist, whose novel research has made major contributions to our understanding of perception, cognition and issues in psychiatry. His work explores topics spanning from the flow of information in the cortex during visual recognition to the importance of mental simulations for planning and foresight in the brain, and from the effect of form on aesthetic preferences to a clinical theory on mood and depression. Prof. Bar uses neuroimaging (fMRI, MEG), psychophysical and computational methods in his research.

Itai Palti is an architect and researcher focusing on designing with the human experience in mind. Practicing internationally, he has also worked alongside the late worldrenowned architect Jan Kaplicky at Future Systems. He is a fellow at The Centre for Urban Design and Mental Health, has edited its inaugural journal, and also contributed to a number of international publications such as The Guardian. Itai is an adjunct faculty member at the Bezalel Academy of Arts and Design and a visiting critic at other academic institutions. His work on the concept of Conscious Cities has helped it emerge as a new field of research to improve our built environment.