BRAIN RESPONSES TO FACES AFTER URBAN VERSUS NATURE EXPOSURES

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Introduction

Viewing pictures of nature enhances attention functioning (1, 2).

Attention comprises exogenous and endogenous processes (3, 4). Endogenous attentional processes can be measured using the P1 (5, 6). Exogenous processes can be measured using theta band activity (7, 8).

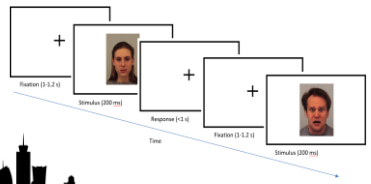
We aimed to test the effects of city and nature exposures on theta and P1 responses to faces.

Methods

2 experiment; measured EEG (ANT Neuro – 64 channels) for 2 separate groups of 24 young adults

2 sessions;
Phase 1 – videos; city and nature videos

Phase 2 – task: gender discrimination task
4 expressions; neutral, happy, fearful and angry



References; 1) Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. Psychological science, 19(12), 1207-1212. 2) Berto, R. (2005). Exposure to restorative environments helps restore attentional capacity. Journal of environmental psychology, 25(3), 249-259. 3) Wolfe, J. M., & Horowitz, T. S. (2004). What attributes guide the deployment of visual attention and how do they do it?. *Nature reviews neuroscience*, *5*(6), 495-501. 4) Posner, M. I., Snyder, C. R., & Davidson, B. J. (1980). Attention and the detection of signals. *Journal of experimental psychology: General*, *109*(2), 160. 5) Heinze, H. J., Luck, S. J., Mangun, G. R., & Hillyard, S. A. (1990). Visual event-related potentials index focused attention within bilateral stimulus arrays. I. Evidence for early selection. *Electroencephalography and clinical neurophysiology*, *75*(6), 511-527. 6) Mangun, G. R., & Hillyard, S. A. (1988). Spatial gradients of visual attention: behavioral and electrophysiological evidence. *Electroencephalography and clinical Neurophysiology*, *70*(5), 417-428. 7) Bastos, A. M., Vezoli, J., Bosman, C. A., Schoffelen, J. M., Oostenveld, R., Dowdall, J. R., ... & Fries, P. (2015). Visual areas exert feedforward and feedback influences through distinct frequency channels. *Neuron*, *85*(2), 390-401. 8) Phillips, J. M., Vinck, M., Everling, S., & Womelsdorf, T. (2014). A long-range fronto-parietal 5-to 10-Hz network predicts "top-down" controlled guidance in a task-switch paradigm. *Cerebral Cortex*, *24*(8), 1996-2008.

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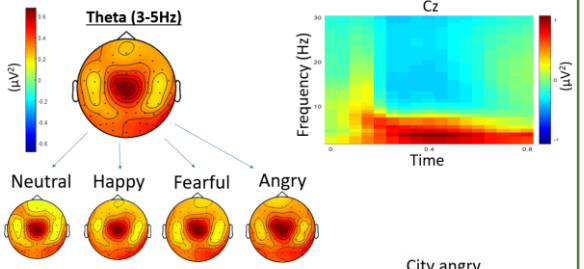
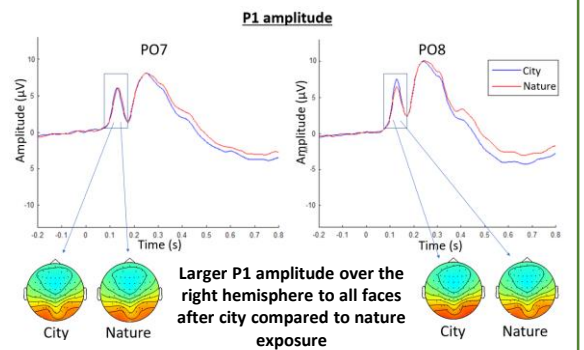
Results Experiment 1

Nature video | City video with faces



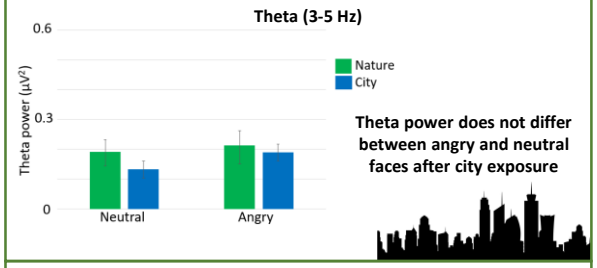
Greater theta response to angry than neutral faces after city exposure



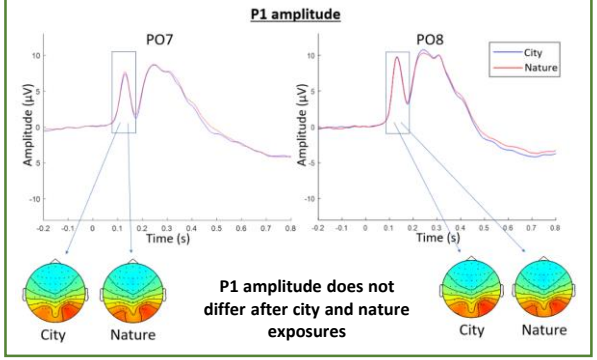
Larger P1 amplitude over the right hemisphere to all faces after city compared to nature exposure

Results Experiment 2

Nature video | City video without faces



Theta power does not differ between angry and neutral faces after city exposure



P1 amplitude does not differ after city and nature exposures

Discussion

Urban video enhances exogenous attention allocation to all faces and endogenous processing of angry faces. Exposure to faces during the video seems to be a key contributor.

Increased theta response to angry faces is similar to what is seen in social rejection.

What would happen if we see lots of faces the nature video?