

Processing of emotional faces after forest versus city exposure

Eszter Toth, Ali Mazaheri & Jane Raymond

EXT586@student.bham.ac.uk

Introduction

- Living in green, rural areas v. cities is associated with better mental health (1).
- Poor emotion regulation may be an important factor in the development of mental disorders (3). Poor emotion regulation refers to one's inability to control emotions. This causes large and frequent fluctuations in emotions and poor predictability of one's next emotional state (4).
- When exposed to social stress, urban dwellers v. rural dwellers show greater activation in the amygdala (5), a brain region key to processing threat information (6). This suggests that exposure to cities causes over-responsiveness to stressful events.
- Poor emotion regulation may be further complicated by poor understanding (i.e., recognition) of others' emotions (7).
- One way to measure responsiveness to stimuli is using Event Related Potentials (ERPs). (See Fig. 1.) P300 is an ERP that is involved in emotion processing (8).

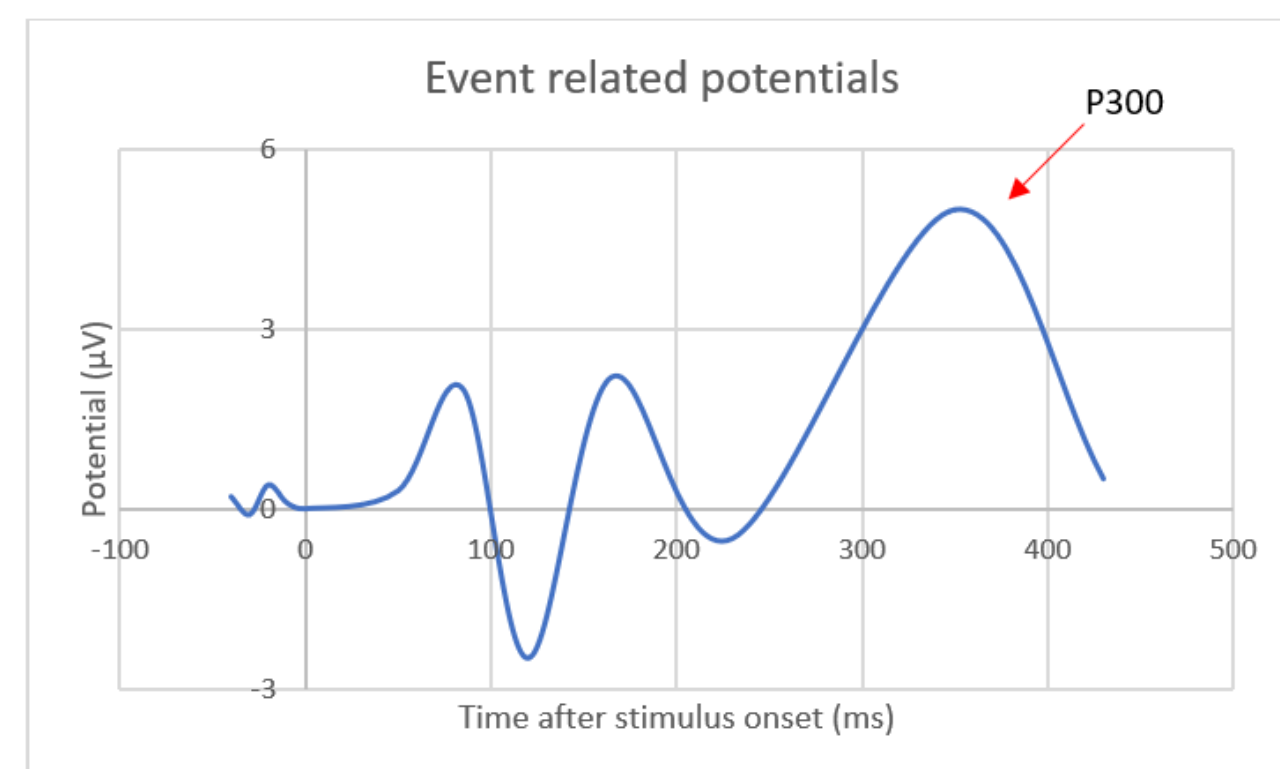


Figure 1: An example ERP waveform. ERPs are the brain activity in response to a specific stimulus. To be able to see a waveform like this, we need to average the brain response to a specific stimulus across many trials. ERPs are measured using EEG. (See Fig. 2.)

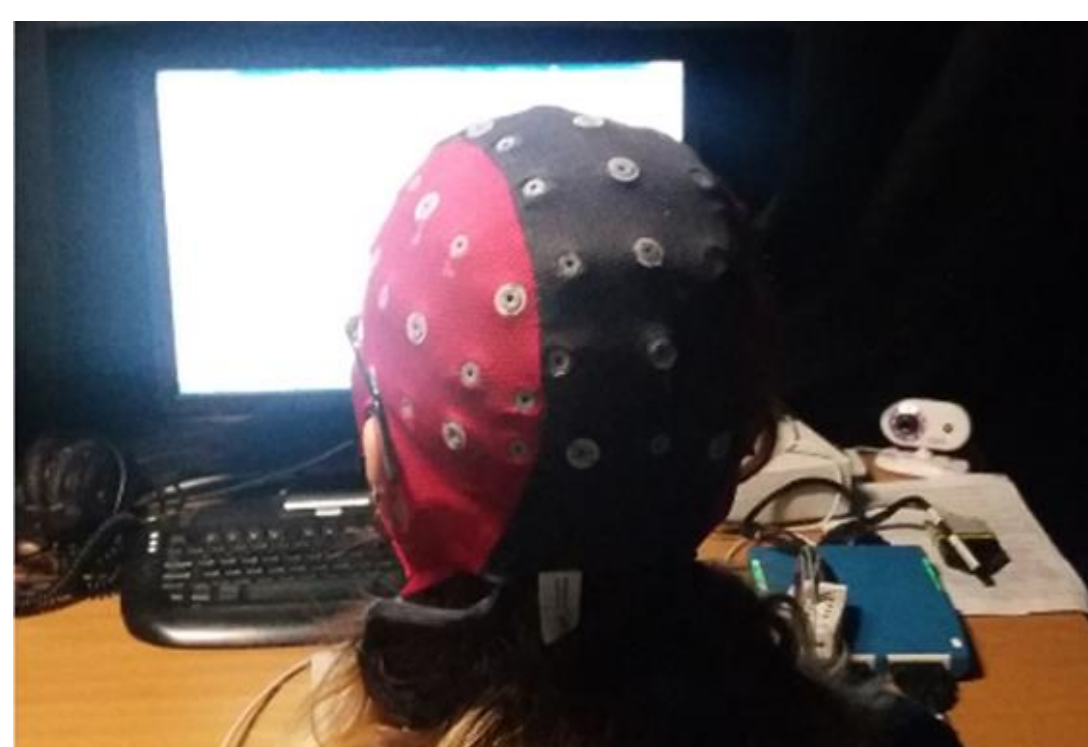


Figure 2: A person participating in an EEG experiment. The grey circles on the cap are electrodes detect electrical activity in the brain via contact with the scalp. Signals are amplified, then synchronised with stimuli onsets and analysed.

Aims

To determine whether;

- Exposure to nature can promote better emotional regulation.
- Exposure to nature improves recognition of others' emotions.

Hypotheses

- Participants' P300 response to negative emotional faces will be significantly smaller after exposure to nature v. city.
- Participants will be significantly better at recognising others' emotion after exposure to nature than after exposure to a city.

Methods

- 2 sessions over 2 consecutive days.
- Phase 1: Assess participants' mood, stress levels, autism trait, socio-economic status, general attitudes about cities and green spaces, childhood environment.
- Phase 2: Watch either a forest or a city walk video for 30 minutes.
- Phase 3: Perform a task where participants judge gender of faces while recording EEG. (See Fig. 3.) Interested in the P300 response to emotional v. neutral faces.

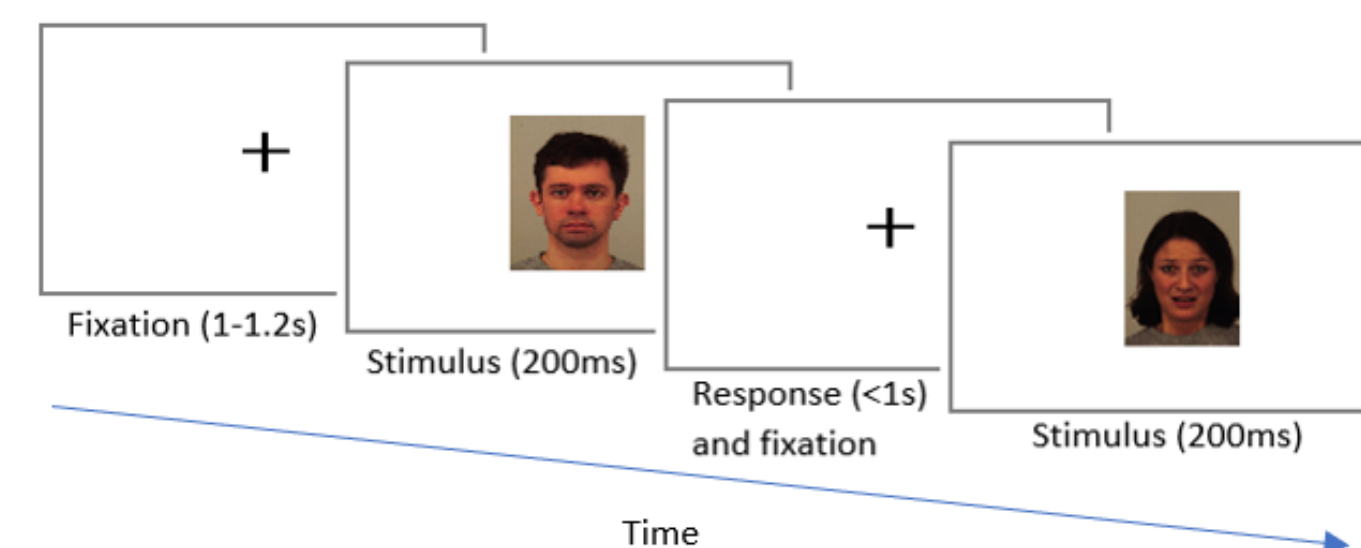


Figure 3: The stimulus is a picture of either a male or a female, looking angry, happy, fearful or neutral. Neutral expressions are presented on 70% of the trials, and each emotions on 10% of trials. There are 1200 trials with breaks after every 60 trials.

- Phase 4: Perform the RMET, where participants judge the emotions of eyes. (See Fig 4.)



Figure 4: How do you think this person is feeling?

References

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Expected results

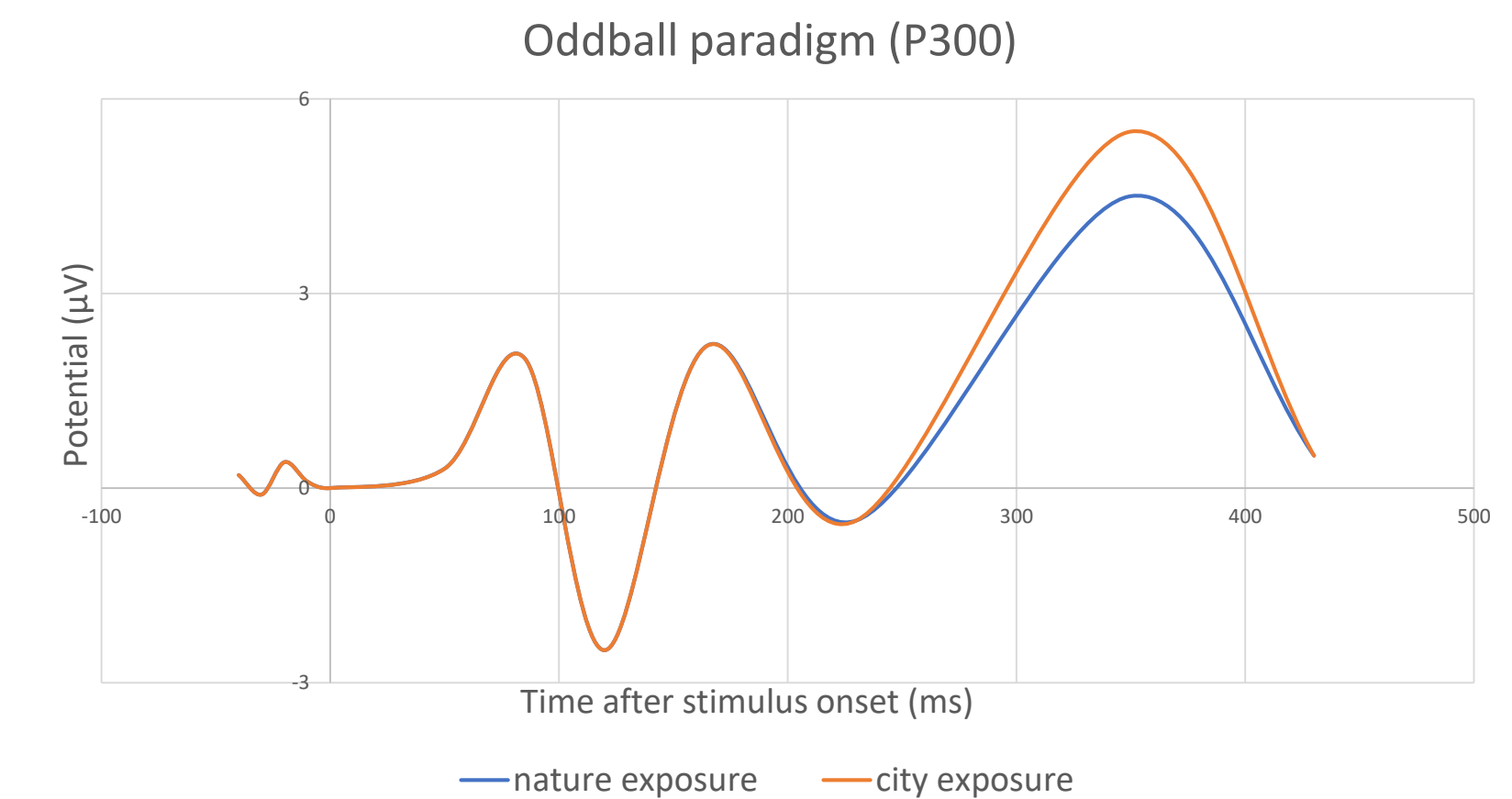


Figure 5: P300 response to negative emotional faces will be bigger after exposure to a city (orange) compared to after exposure to nature (blue). This will show that exposure to city environment makes us more sensitive to threatening information.

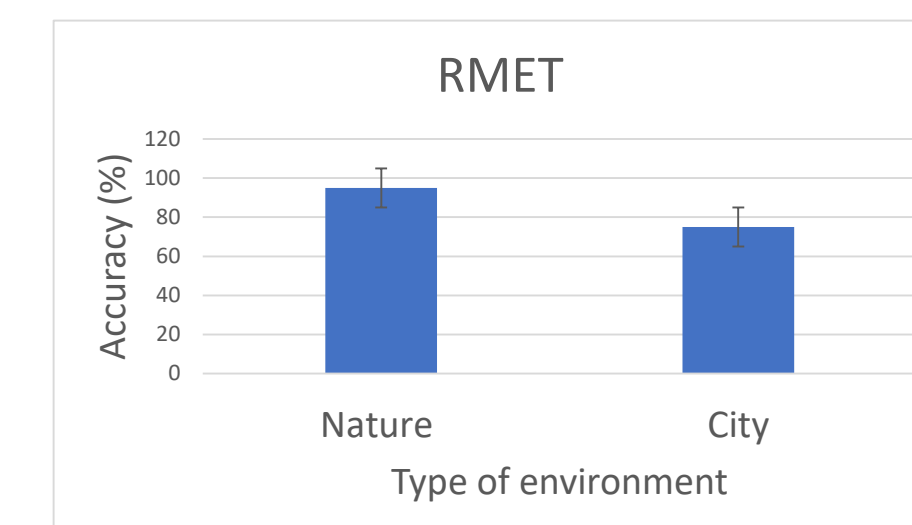


Figure 6: Participants will recognize others' emotions more accurately after exposure to nature compared to after exposure to a city. This may show that exposure to city environments reduces our ability to infer social cues, such as facial expressions, accurately.

Discussion

- Exposure to cities v. nature increases responsiveness to negative emotional faces, showing that city v. rural dwellers have poorer emotion regulation.
- This is likely to contribute to poorer mental health in urban v. rural areas.
- Exposure to nature is important for mental health.
- This could be applied to encourage city-dwellers to spend more time in natural environments, reducing the risk of mental disorders. This would relieve the pressure on the NHS.
- It may also encourage city planners to include more green spaces within urban areas to the benefit of city communities.