

## Sustainability | Individual communication

### IC - (21009) - HOW NATURE NURTURES: AMYGDALA ACTIVITY DECREASES AS THE RESULT OF A ONE-HOUR WALK IN NATURE

Sonja Sudimac<sup>1</sup>; Vera Sale<sup>1</sup>; Simone Kühn<sup>1,2</sup>

1 - Max Planck Institute for Human Development, Lise Meitner Group for Environmental Neuroscience, Lentzeallee 94, 14195 Berlin, Germany; 2 - University Medical Center Hamburg-Eppendorf, Department of Psychiatry and Psychotherapy, Martinistr. 52, 20251 Hamburg, Germany

#### **Background and objectives**

Even though it has many advantages, living in a city is associated with high incidence of mental disorders, such as major depression, anxiety disorders, and schizophrenia. It has been suggested that urban upbringing is the most important environmental factor for developing schizophrenia. Therefore, it is essential to understand how exposure to urban and natural environments affects mental health and the brain. The amygdala, a brain region related to stress and schizophrenia, has been shown to be more activated during a stress task in urban compared to rural dwellers. Nevertheless, intervention studies are needed to demonstrate causal effects of natural and urban environments on stress-related brain mechanisms.

#### **Process and methods (for empirical research)**

To address this question, we conducted an intervention study investigating effects of a 60-minute walk in urban (busy street in Berlin) vs. natural environment (forest) on brain activity in regions associated with stress. Amygdala activation was measured in 63 healthy participants, before and after the walk, using fMRI stress paradigms.

#### **Main results (or main arguments in the case of critical reviews)**

As predicted, the findings reveal that amygdala activation remains stable after the walk in urban environment, whereas it decreases after the walk in nature.

#### **Implications for research and practice/policy | Importance and originality of the contribution**

To our knowledge, this is the first study to demonstrate causal effects of acute exposure to a natural vs. urban environment on stress-related brain regions, disentangling positive effects of nature from negative effects of city. The results strongly argue in favor of salutogenic effects of nature as opposed to urban exposure causing additional stress. This study suggests that going for a walk in nature can have salutogenic effects for stress-related brain regions, and in turn act as a preventive measure against developing a mental disorder. Understanding how urban and natural environments affect stress-related neural mechanisms aims to influence urban design policies to create more green areas and adapt urban environments in a way that are beneficial for citizens' mental health.

**Palavras-chave :** natural environment, urban environment, brain, amygdala, fMRI, stress, mental health, restorativeness, environmental neuroscience, urban planning, green cities