PSYCHIATRIC DISORDERS

The stress of city life

City living is associated with a stressful social environment as well as an increased risk of mental illness; of note, the prevalence of mood and anxiety disorders is higher in urban areas than in rural areas and the incidence of schizophrenia is greater in people born and brought up in cities. Longitudinal studies suggest that the effects of the urban environment on mental health disorders are causal, but it is unclear how urbanicity affects brain function. Now, Meyer-Lindenberg and colleagues show that city living and urban upbringing are associated with altered neural processing of acute social stress.

The authors subjected 32 healthy people, including individuals with rural and urban upbringings and habitation, to a social stress paradigm — the Montreal Imaging Stress Task (MIST) — and concurrent functional MRI (fMRI). MIST involves solving a series of arithmetic problems under time pressure. To add further pressure, the authors provided the participants with negative feedback during the task.

Meyer-Lindenberg and colleagues found that urban living was associated with activity in the amygdala during MIST. Interestingly, the level of such activity correlated with the population of the area: city dwellers (that is, individuals living in a place with >100,000 inhabitants) showed notably higher activity in this brain region than people living in towns (defined as >10,000 inhabitants), who in turn had higher activity than people living in rural areas. The authors also discovered that urban upbringing was associated with activation of the perigenual anterior cingulate cortex (pACC) during this task, and the highest activity was observed in individuals brought up exclusively in cities.

The authors replicated their findings in a second cohort of 23 healthy participants using a different stress paradigm and hence demonstrated that the observed associations were not specific to MIST. Finally, they assessed 37 adults using fMRI during a cognitive task that did not involve stress. Here, no associations were found between urbanicity and activation of the amygdala or the pACC, suggesting that the effects observed in the first two experiments were due to social stress rather than the cognitive tasks.

This study provides evidence linking urbanicity to altered social neural processing of stress. Interestingly, the brain regions identified by the authors have been previously linked to mental health disorders: the amygdala has been implicated in anxiety disorders and in depression, whereas the pACC might have a role in schizophrenia. Thus, according to Meyer-Lindenberg and colleagues, future work should establish whether direct links exist between these brain regions and psychopathology during conditions of stress.

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