City Living and Anxiety

The brains of people living in cities operate differently from those in rural areas, according to a brain-scanning study. Scientists found that two regions, involved in the regulation of emotion and anxiety, become overactive in city-dwellers when they are stressed and argue that the differences could account for the increased rates of mental health problems seen in urban areas.

Previous research has shown that people living in cities have a 21% increased risk of anxiety disorders and a 39% increased risk of mood disorders. In addition, the incidence of schizophrenia is twice as high in those born and brought up in cities.

In the new study, Professor Andreas Meyer-Lindenberg of the University of Heidelberg in Germany scanned the brains of more than 50 healthy volunteers, who lived in a range of locations from rural areas to large cities, while they were engaged in difficult mental arithmetic tasks. The experiments were designed to make the groups of volunteers feel anxious about their performance.

The results, published in Nature, showed that the amygdala of participants who currently live in cities was over-active during stressful situations. "We know what the amygdala does; it's the danger-sensor of the brain and is therefore linked to anxiety and depression," said Meyer-Lindenberg.

Another region called the cingulate cortex was over active in participants who were born in cities. "We know [the cingulate cortex] is important for controlling emotion and dealing with environmental adversity."

This excess activity could be at the root of the observed mental health problems, said Meyer-Lindenberg. "We speculate that stress might cause these abnormalities in the first place – that speculation lies outside what we can show in our study, it is primarily based on the fact that this specific brain area is very sensitive to developmental stress. If you stress an animal, you will find even structural abnormalities in that area and those may be enduring and make an animal anxious. What we're proposing is that stress causes these things and stress is where they are expressed and then lead to an increased risk of mental illness."

By 2050, almost 70% of people are predicted to be living in urban areas. On average, city dwellers are "wealthier and receive improved sanitation, nutrition, contraception and healthcare", wrote the researchers in Nature. But urban living is also associated with "increased risk for chronic disorders, a
more demanding and stressful social environment and greater social disparities. The biological components of this complex landscape of risk and protective factors remain largely uncharacterised."

In an accompanying commentary in Nature, Dr Daniel Kennedy and Prof Ralph Adolphs, both at the California Institute of Technology, said that there are wide variations in a people's preferences for, and ability to cope with, city life.

"Some thrive in New York city; others would happily swap it for a desert island. Psychologists have found that a substantial factor accounting for this variability is the perceived degree of control that people have over their daily lives. Social threat, lack of control and subordination are all likely candidates for mediating the stressful effects of city life, and probably account for much of the individual differences."

Working out what factors in a city cause the stress in the first place is the next step in trying to understand the mental health effects of urban areas. Meyer-Lindenberg said that social fragmentation, noise or over-crowding might all be factors. "There's prior evidence that if someone invades your personal space, comes too close to you, it's exactly that amygdala-cingulate circuit that gets [switched on] so it could be something as simple as density."

He said the research could be used, in future, to inform city design.

"What we can do is try and make cities better places to live in from the view of mental health. Up to now, there really isn't a lot of evidence-base to tell a city planner what would be good, what would be bad."