

A CULTURE OF DISCOVERY

IN BEHAVIOUR AND MENTAL HEALTH

Do cultural practices modify neural mechanisms underpinning our behaviour? Integrating non-invasive brain imaging technologies with multiple behavioural paradigms, Han Shihui and his colleagues from Peking University (PKU) School of Psychological and Cognitive Sciences have found evidence of the effect of culture on the brain.

They reveal that Chinese people tend to have enhanced neural responses to family members and friends, whereas Westerners show greater responses to oneself. The difference can be explained by cultural values, such as interdependence, which emphasizes connections between self and significant others, said Han.

Their finding that priming interdependence modulates brain activity underlying sensory, perceptual and affective processing indicates causal influences of culture on the neural underpinnings of cognition and emotion. "Culturally contextualized behaviour shapes brain functional organization and results in voluntary behaviour that helps individuals adapt to new cultural environments," Han explained.

Natural factors may also influence behavioural patterns. Wang Lei, another professor of the school, has led a team mapping geographic distribution of personality traits in China. His group collected data from 59 cities, and found that regional ambient temperature is linked to personality, even after controlling for migration, subsistence style, pathogen prevalence, per capita GDP and population density.

Specifically, a benign temperature is associated with a sociable personality and plasticity, characterised by agreeableness, conscientiousness, emotional stability, extraversion and openness to new experience.

Wang's international team has also replicated the results using data of more than 1.66 million people from the United States, demonstrating robust evidence of the relationship between temperature and personality traits.

Better understanding of geographic personality variations will improve communication and cooperation amongst people from different places and allow investigation of the relationship between personality and region-specific diseases.

The school has also made breakthroughs in cognitive neuroscience. Using magnetoencephalography (MEG) recordings, PKU professor Luo Huan examined how the human brain integrates fragmented visual elements into organized objects in noisy scenes. Luo's group demonstrated that the higher-order brain region extracts the global form of visual inputs within 100 milliseconds. The global structure information is relayed along the dorsal stream in a reversed hierarchical pathway to modulate local analysis in low-level sensory areas. This global-to-local processing cascade enables a quick 'initial guess' to resolve ambiguities in noisy environments.

Luo's group also demonstrated the spatiotemporal distribution of attention when processing multiple visual objects. They found that attention samples multiple visual objects sequentially, and that this sampling pattern changes in different attentional contexts. ■

SEEKING improved mental health

At China's top mental health hospital, Peking University Sixth Hospital (Institute of Mental Health), a team led by its director, Lu Lin, works on novel therapies for mental and substance use disorders.

Focusing on the neurobiological mechanisms underlying pathological memories, which contribute to a variety of mental conditions such as anxiety, addiction and post-traumatic stress disorders, investigation by Lu's team has led to a series of novel approaches to erase memories by making them unstable. Their proposed behavioural and drug treatments are published in leading journals, including *Science*.

With 'passion for science and compassion for people', Lu's team has established a new method to eliminate adverse emotional reactions of pathological memory-related disorders in the unconscious state of sleep, having significantly lessened patients' pain. They have also developed several novel fast-acting antidepressant candidates by revealing a new glutamatergic mechanism, filling the current treatment gap.



Lu Lin and his team are committed to improving mental health outcomes with novel therapies.

