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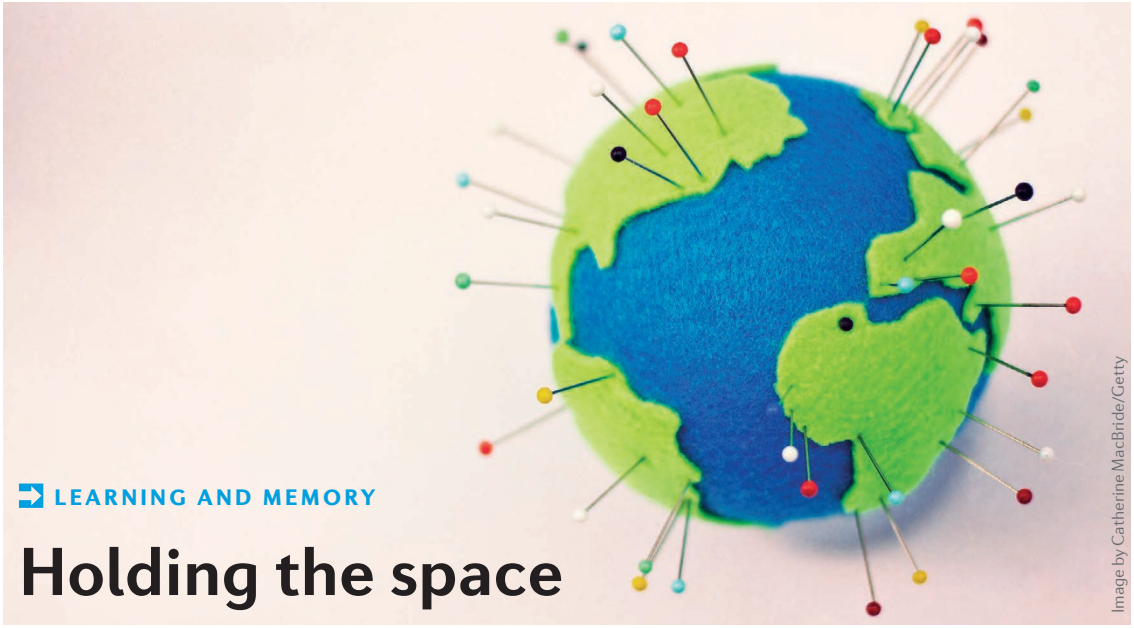

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LEARNING AND MEMORY

Holding the space

> spatial representation of the irrelevant spatial position is maintained in working memory throughout the non-spatial working memory task

Working memory is an online memory system that is used to hold information 'in mind', and there is clear evidence that observers have voluntary control over what is stored in this system. Spatial position, however, may be an interesting exception to this rule. Even when position is irrelevant, behavioural tests still suggest that spatial position is remembered. Such findings have led researchers to hypothesize that space is an essential part of all visual working memories. The past data had not proved that spatial position is automatically stored in working memory, however, because behaviour in working memory tasks can also be guided by other memory systems. Here, Foster *et al.* used a direct measure of online memory activity to test whether space is spontaneously stored in working memory.

The authors recorded electroencephalogram activity during a colour working memory task. Participants were shown a sample dot of a certain colour in one of eight different positions on a screen. After a short interval, the participants reported the colour of the sample stimulus on a colour wheel. Crucially, the location of the sample stimulus varied from trial to trial, but the location was never tested; thus, it was possible to determine whether spatial information was maintained while non-spatial working memory was engaged.

Oscillations in the α-band (8–12 Hz) have previously been shown to encode actively maintained spatial positions, providing a robust measure of spatial representations held in working memory. The authors entered continuous measurements of α-band oscillations into a spatial encoding model to identify neural activity that coded for spatial location. The authors found that α-band activity with strong spatial selectivity persisted during the retention interval, suggesting that a spatial representation of the irrelevant spatial position is maintained in working memory throughout the non-spatial working memory task. This result provides a striking contrast with previous findings, which have established that non-spatial features (such as colour or orientation) are not maintained in working memory when they are not relevant.

These findings provide strong evidence that spatial positions are stored spontaneously even when they are irrelevant to the task at hand, which is in line with the broader hypothesis that spatial position is an integral part of visual representations.

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ORIGINAL ARTICLE Foster, J. J. *et al.* Alpha-band activity reveals spontaneous representations of spatial position in visual working memory. *Curr. Biol.* **27**, 3216–3223 (2017)