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Space travel

Astronaut thinking slows in space

Effects on working memory and processing speed could be a problem for future missions

Alex Wilkins

ASTRONAUTS on the International Space Station (ISS) had reduced memory, attention and processing speed after six months, raising concerns about the impact of cognitive impairment on future space missions to Mars.

The extreme environment of space, with reduced gravity, harsh radiation and the lack of regular sunrises and sunsets, can have dramatic effects on astronaut health, from muscle loss to an increased risk of heart disease. However, the cognitive effects of long-term space travel are less well documented.

Now, Sheena Dev at NASA's Johnson Space Center in Houston, Texas, and her colleagues have looked at the cognitive performance of 25 astronauts during their time on the ISS.

The team put the astronauts through the same set of 10 tests both on Earth and on the ISS. These were repeated once before, twice during and twice after the mission, within 10 and 30 days of landing. The tests measured cognitive capacities, such as finding patterns on a grid to gauge abstract

reasoning or choosing when to stop an inflating balloon before it pops to test risk-taking.

The researchers found that the astronauts took longer to complete tests measuring processing speed, working memory and attention on the ISS than on Earth, but they were just as accurate. While there was no overall cognitive impairment or lasting effect on the astronauts'

When you are working in space, there is a lot to keep track of

abilities, some measures, like processing speed, only returned to normal some time after they came back to Earth (*Frontiers in Physiology*, doi.org/ns8p).

Having clear data on the cognitive effects of space travel will be crucial for future human space flight, says Elisa Raffaella Ferrè at Birkbeck, University of London, but it will be important to collect more data, both on Earth and in space, before we know the full picture.

"A mission to Mars is not only longer in terms of time,

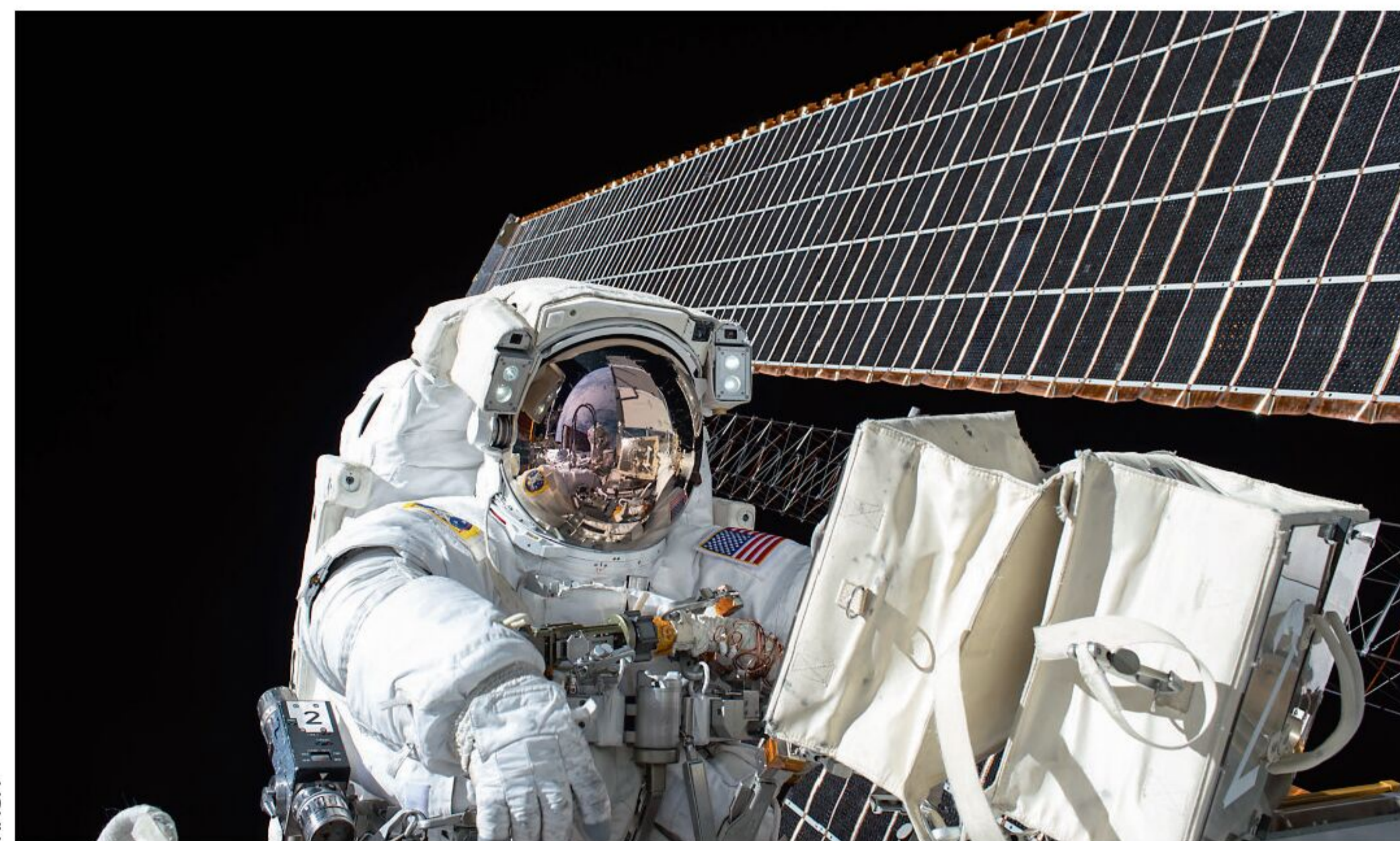
but also in terms of autonomy," says Ferrè. "People there will have a completely different interaction with ground control because of distance and delays in communication, so they will need to be fully autonomous in taking

"You definitely don't want to have astronauts on Mars with slow reaction times"

decisions, so human performance is going to be key. You definitely don't want to have astronauts on Mars with slow reaction times, in terms of attention-related tasks or memory or processing speed."

It isn't surprising that there were some specific decreases in cognitive performance given the unusual environment of space, says Jo Bower at the University of East Anglia in Norwich, UK.

"It's not necessarily a great cause for an alarm, but it's something that's useful to be aware of, especially so that you know your limits when you're in these extreme environments," she says. ■



NASA

Ecology

Giant hornet from Asia appears in Europe for first time

SOUTHERN giant hornets, a species native to Asia, have been sighted in Europe, raising concerns about their potential impact on native insects.

Between 2022 and 2023, Omar Sánchez Fernández at the University of Oviedo, Spain, and his colleagues found four giant hornets in wasp traps in Asturias, Spain. Genetic analysis revealed that these four female workers were southern giant hornets, *Vespa soror* (*Ecology*

and *Evolution*, doi.org/ns8r).

"Although beekeepers in the area had told us that they had seen strange hornets, it was a surprise to discover this species," says Sánchez.

Southern giant hornets are usually found in warmer parts of Asia, in countries such as China, India and Thailand. The workers are up to 35 millimetres long and the queens can reach 46 millimetres. They hunt invertebrates such as butterflies, grasshoppers, bees and other wasp species, but also small vertebrates like geckos.

Another Asian species, the yellow-legged hornet (*Vespa*



RUSHEN

velutina), is now widespread across most of Europe, having first arrived two decades ago. Its impact as a predator of honeybees and native bees is a concern, with the economic cost in France alone estimated at over €30 million a year.

While the sting of southern giant

Southern giant hornets are normally found in countries like China, India and Thailand

hornets isn't pleasant, and is probably a bit worse than Europe's native hornet species, they aren't really more dangerous to humans, says Benjamin Taylor at Purdue University, Indiana. "They're not super aggressive unless they're approached," he says.

Sánchez and his colleagues suspect the species reached Spain as a stowaway in a shipment and don't think it is widespread in the area. ■

Gennaro Tomma