Space travel may strip away the mind's oldest anchor, opening a state of consciousness humans rarely experience

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Credit: Image generated by the author using AI for illustrative purposes

When astronauts float free of Earth's pull, their bodies adapt—but something strange happens in their minds. Many report feeling

"unmoored," "expanded" or "disconnected," as if reality itself has shifted. Iconic cases like Apollo 14's Edgar Mitchell (who said viewing Earth from the moon made international politics seem "petty") hint at profound, almost spiritual changes in perspective.

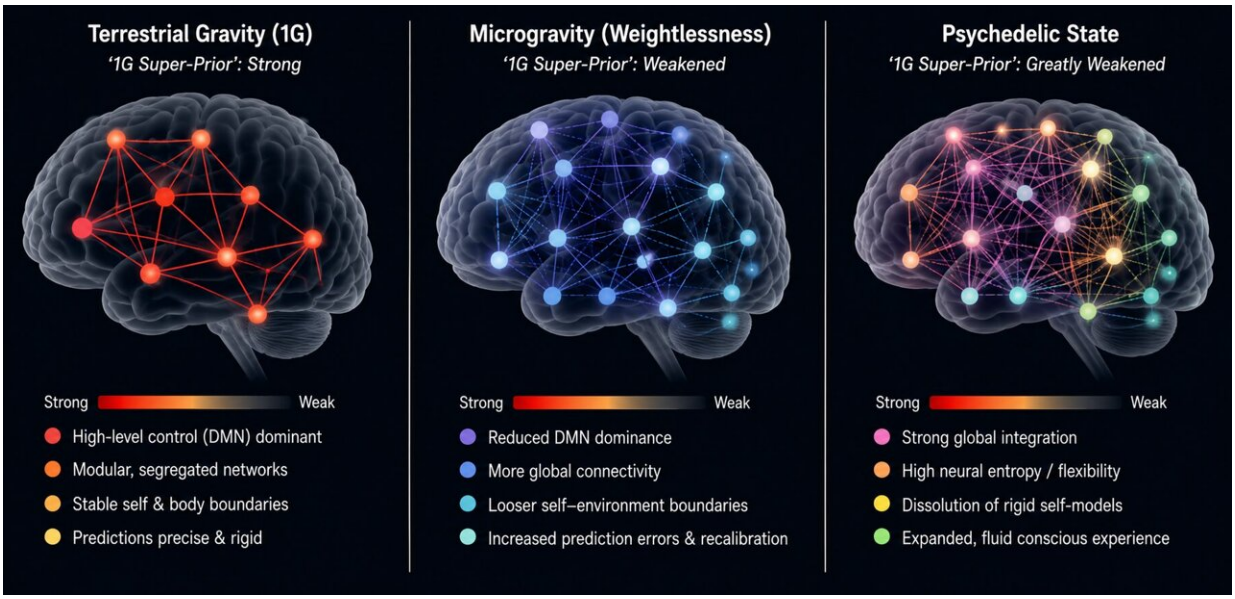
Now, a new study, published in the journal *Frontiers in Psychology*, argues this isn't just poetic musing; it's a fundamental neurocognitive phenomenon. According to researchers, our brains have quietly "scaffolded" consciousness on gravity for eons, and removing this constant anchor forces a surprising and profound recalibration of the mind.

Brain's invisible anchor

One of the paper's main points is blunt: "Gravity is not merely a physical constraint on the body, but a foundational scaffold for human consciousness."

In practical terms, our inner ear (vestibular) sensors constantly tell the brain which way is "down," making Earth's 1G pull the brain's most reliable sensory input. In neuroscience jargon, gravity acts as a built-in "super-prior"—a constant expectation that stabilizes perception and self-location. We hardly notice this background certainty until it's gone.

Scientists describe this built-in expectation as the brain's 1G super-prior. On Earth, it helps us predict motion, maintain balance and feel grounded in our body. In space, however, "these strong prior conflicts with diminished or absent vestibular signals," the authors explain, triggering cascades of prediction errors that the brain must resolve. Without gravity's pull, the brain is forced to rewrite its assumptions from scratch.



A conceptual model showing how gravity may shape consciousness. Under Earth's gravity, the brain maintains a strong "1G super-prior" that helps stabilize body awareness, perception, and the sense of self. In microgravity, the loss of gravitational cues may weaken this anchor, leading to broader brain network changes and a more flexible conscious experience. The model compares this shift with psychedelic states, where brain organization can also become less rigid and more globally connected. Credit: Image generated by the author using AI for illustrative purposes

Unmoored minds in orbit

With that gravitational anchor gone, the brain enters unfamiliar territory. Early space missions documented acute disorientation and motion sickness—the brain's first frantic attempts to cope. But the new paper goes further: It compiles reports and studies suggesting even emotional and existential shifts. Astronauts describe a loosening of normal boundaries between self and world. Their self-location drifts, and body feelings grow unstable.

Paradoxically, this disorientation sometimes opens a doorway. Many astronauts report an "Overview Effect"—a sudden feeling of awe, oneness and revalued purpose upon seeing Earth from space. Viewing our fragile planet can trigger an "immediate reorganization of values," ecological concern and a deep sense of connectedness. In short, the same factors that make space disorienting also seem to unleash creativity and insight.

Earthbound science is beginning to catch up. Brain scans before and after long missions find physical shifts: fluids in the head redistribute, ventricles enlarge and gray matter reshapes in some regions.

Functional imaging shows the brain's networks reorganize—sensory and motor areas adapt to new coordination, while the default mode network (linked to self-awareness) temporarily weakens. Even EEG recordings reveal steady drops in the brain's alpha rhythms, a change often tied to heightened arousal and reduced inhibition.

In short, the neural signature of microgravity loosely mirrors what scientists see under psychedelics.

Space vs. psychedelics: Twins of the mind?

The parallels are striking. Just as LSD or psilocybin "flattens" the brain's hierarchy, allowing sensory areas to connect more freely, weightlessness seems to "relax high-level priors, loosen hierarchical constraints and enhance global integration." Both altered states—gravity-free and drug-induced—involve similar outcomes: looser self-boundaries and more fluid perception.

The authors state that microgravity "constitutes a non-pharmacological perturbation that transiently relaxes high-level priors." Space, then, might be considered nature's own "psychedelic" for the brain. The effect

isn't due to chemical changes, but rather a shift in context, leading to a similar computational outcome.

The findings illustrate that whether in the firm grasp of Earth's gravity, floating in zero-G or under the influence of psychedelics, the brain's organizational principles shift. In both microgravity and psychedelic states, the brain's usual top-down controls relax, boosting neuroplasticity and opening pathways to conscious experiences typically beyond our reach on Earth.

A cosmic laboratory

Because spaceflight removes such a fundamental influence, the authors argue it offers a unique "natural experiment" for consciousness. They urge new studies on future missions: track mood, sense of self and worldview along with imaging data.

On Earth, analogs like parabolic flights or virtual reality could mimic partial effects. Intriguingly, they even suggest controlled gravity perturbations might someday have therapeutic uses—perhaps to treat rigid thinking in depression or PTSD.

Meanwhile, the findings have practical stakes: As commercial spaceflight grows, untrained travelers could face bewildering mind states. Astronauts may need new preparation and support, anticipating not just motion sickness but deep perceptual shifts.

Space travel, it turns out, might change not just where you are, but who you are. As the authors conclude, "Spaceflight thus offers a rare, non-pharmacological model for studying how consciousness reorganizes when its most stable constraints are lifted." In floating beyond Earth's gravity, we gain a new vantage point—not only on our planet, but on the hidden framework of the mind.

More information: Annahita Nezami et al, Space Oddity: microgravity as a neurocognitive catalyst for transformative consciousness experiences, *Frontiers in Psychology* (2026). DOI: 10.3389/fpsyg.2026.1769177

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