Contribution ID: **926** Type: **Talk in simposio**

# Decision-making and stress in Isolated and Confined Environments: findings and insights from systematic investigations in spaceflight analogs

*Saturday, September 13, 2025 3:30 PM (20 minutes)*

Background
Long-duration space missions and future settlements on the Moon or Mars raise concerns about how the unique environmental and social conditions of long-term isolation and confinement affect human cognition. Crewmembers in these environments operate under high levels of autonomy, making effective decision-making critical for managing high-stakes situations. However, empirical evidence is still limited.

Objective
The research project examines how long-term isolation and confinement in ground-based spaceflight analog environments affect cognitive functions, focusing on decision-making processes. It was hypothesized that isolation would affect habitual and deliberative decision-making differently. Data were collected longitudinally from two winterover crews during a one-year stay at the Antarctic Concordia station and participants of the SIRIUS-20 8-month confinement study. These studies followed previous evidence obtained in the Arctic and other isolation facilities.

Methods
Participants completed three computerized decision-making tasks in each session: the Iowa Gambling Task (IGT), the Game of Dice Task (GDT), and the Markov Decision Task (MDT). Subjective and physiological stress measures were also collected.

Results
Decision-making under risk (GDT) remained stable, but performance on uncertainty-based tasks (IGT and MDT) changed over time. During mid-isolation, crewmembers at Concordia showed altered learning patterns while SIRIUS participants exhibited shifts in decision strategies. Stress indicators at Concordia partially reflected these behavioral changes.

Conclusions
Long-term isolation affects decision-making under uncertainty, particularly during the central phase. To improve countermeasures for spaceflight, future studies should explore the interacting role of specific environmental stressors, account for individual differences, and adopt more naturalistic and personalized approaches.

## If you're submitting a symposium talk, what's the symposium title?

The Psychology of Space Exploration and Extreme Environments

## If you're submitting a symposium, or a talk that is part of a symposium, is this a junior symposium?

No

**Primary author:** ZIVI, Pierpaolo (Dipartimento di Psicologia, Sapienza Università di Roma)

**Co-authors:** SDOIA, Stefano (Dipartimento di psicologia); VENTURA, ROSSELLA (Dip Psicologia, Sapienza); FERRAVANTE, Denise G. (ENEA Antarctic Technical Unit); FERLAZZO, Fabio (Dipartimento di Psicologia, Sapienza Università di Roma)

**Presenter:** ZIVI, Pierpaolo (Dipartimento di Psicologia, Sapienza Università di Roma)

**Session Classification:** The Psychology of Space Exploration and Extreme Environments

**Track Classification:** Reasoning and abstract cognition