

BIOMEDICINA SPAZIALE
PER LE FUTURE
MISSIONI DI
ESPLORAZIONE UMANA
DELLO SPAZIO:
A CALL TO ACTION
ASI, MARCH 2023

La psicologia nell'esplorazione umana dello spazio: verso un approccio di precisione

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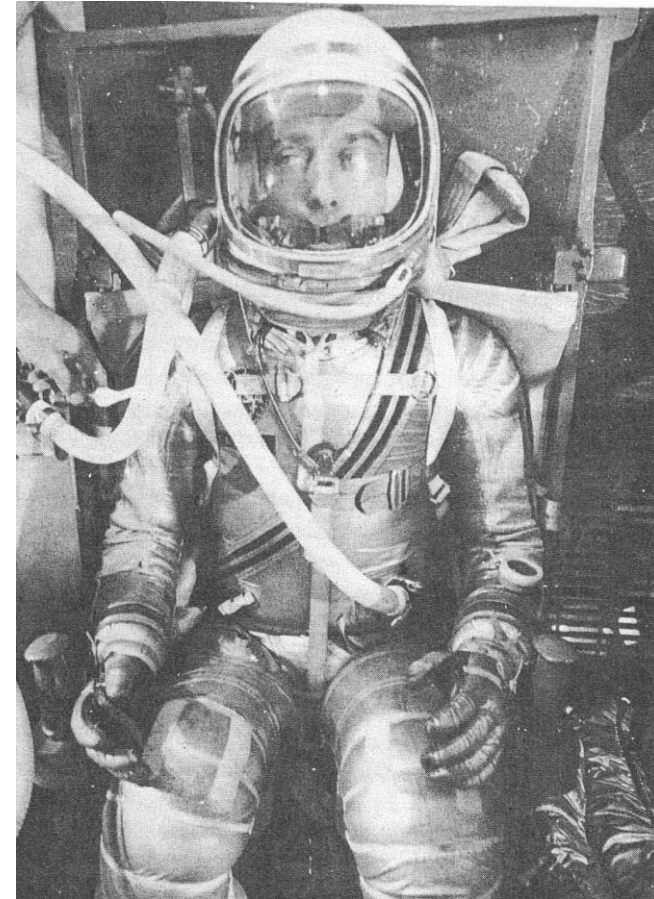
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Stefano Sdoia
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The psychological effects of spaceflight has always been central to the space exploration efforts.

Most conditions (hazards) affect both individual and group psychological processes (e.g., memory, decision-making, mood, clique formation, etc.).

These effects have obvious consequences for the success of a space mission.



Brown (Ed). *Physiology of man in space*, 1963, Academic

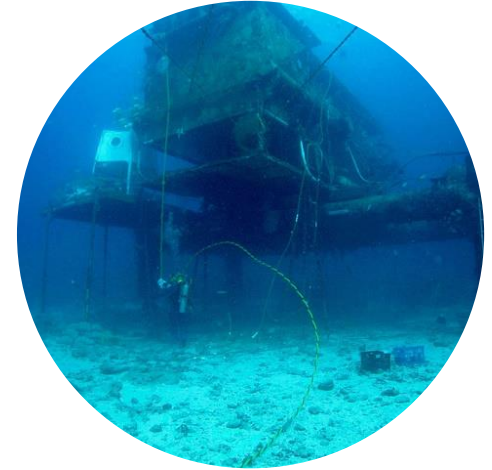
Why and when these effects occur is still largely unclear
(*methodological issues, theoretical issues, lack of systematicity, etc.*):

Different processes

Variability of measures

Individual differences

Analog



Decision making is scarcely investigated

despite its importance

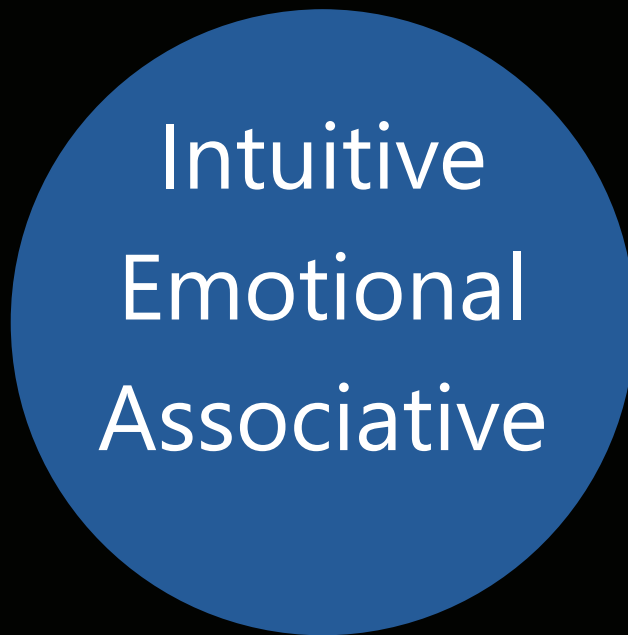


Intuitive
Emotional
Associative

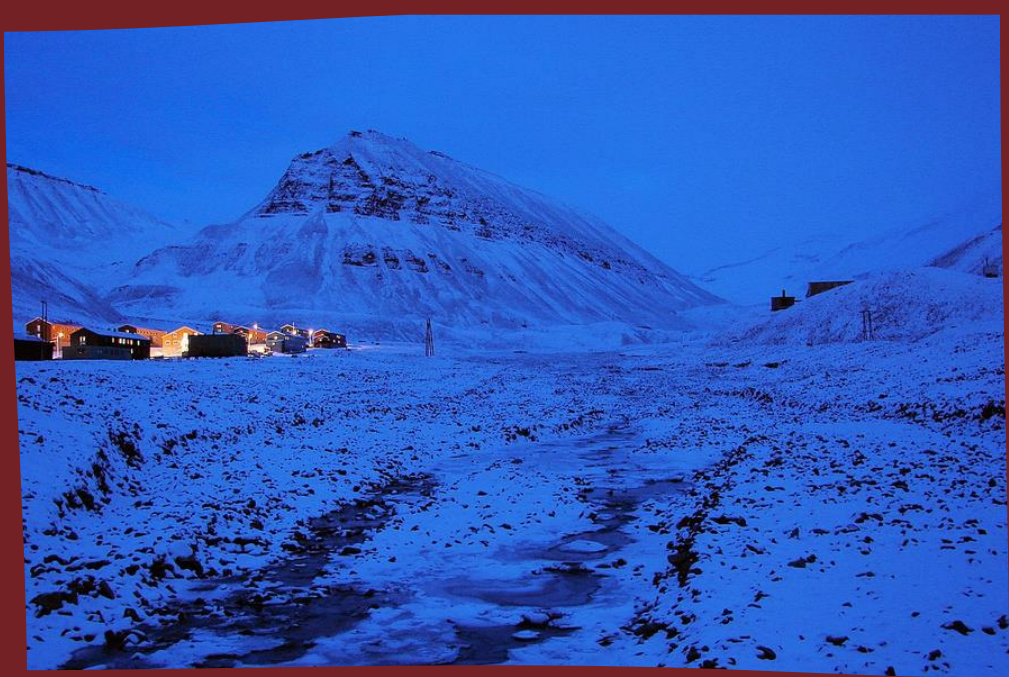
Deliberative
Rational
Analytic

Type 1

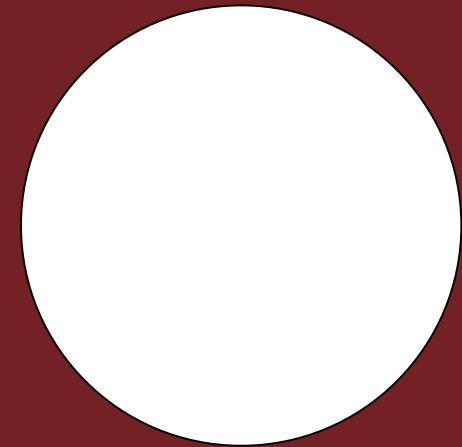
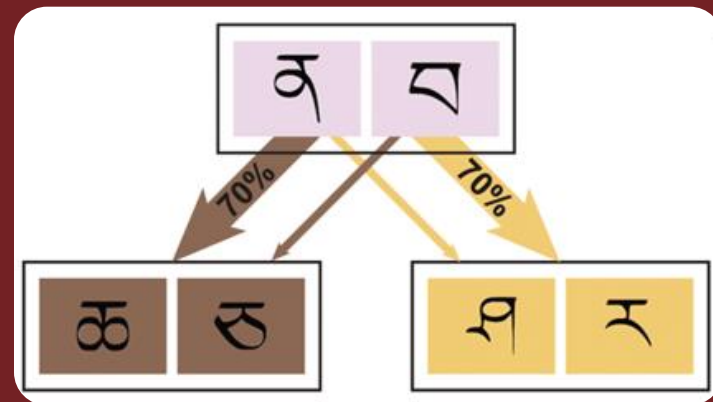
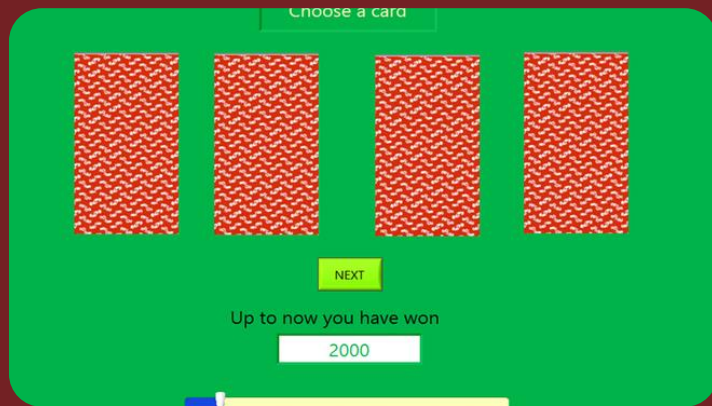
Type 2



Altered light/dark cycle



Longitudinal studies







Ny-Ålesund

79°N - 18m a.s.l.

Svalbard Islands

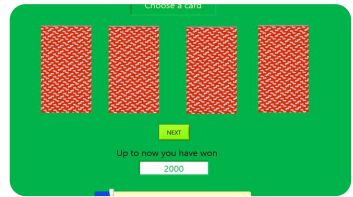


Ny-Alesund Type 1 Tasks

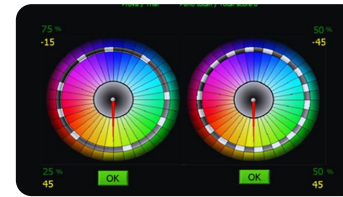
24h Light

12/12h

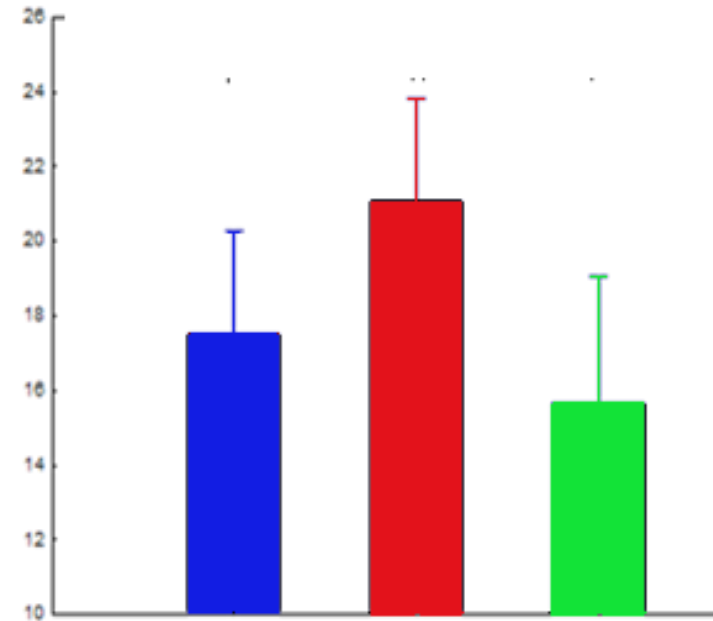
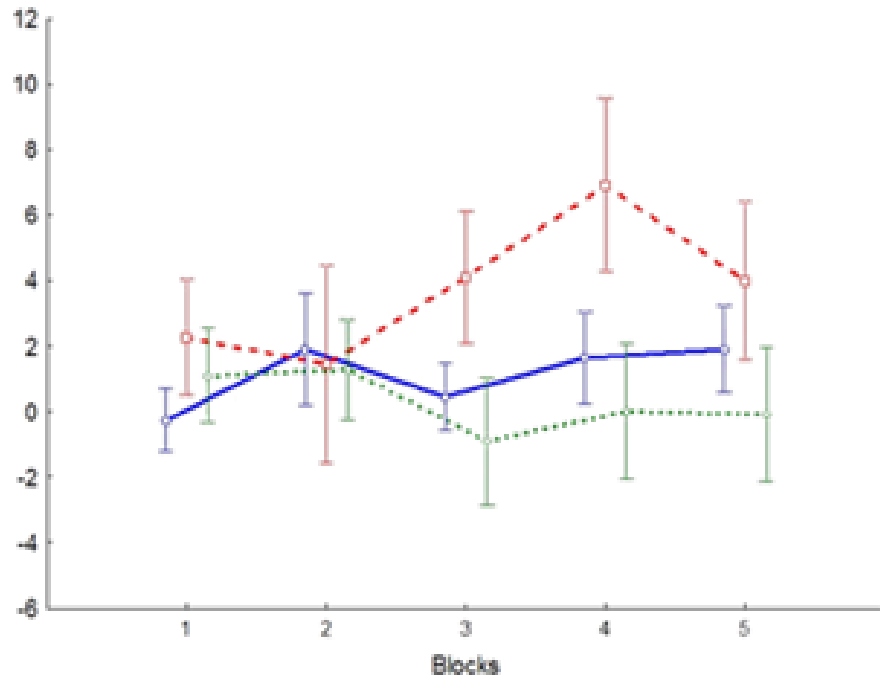
24h Dark



IGT



WFT



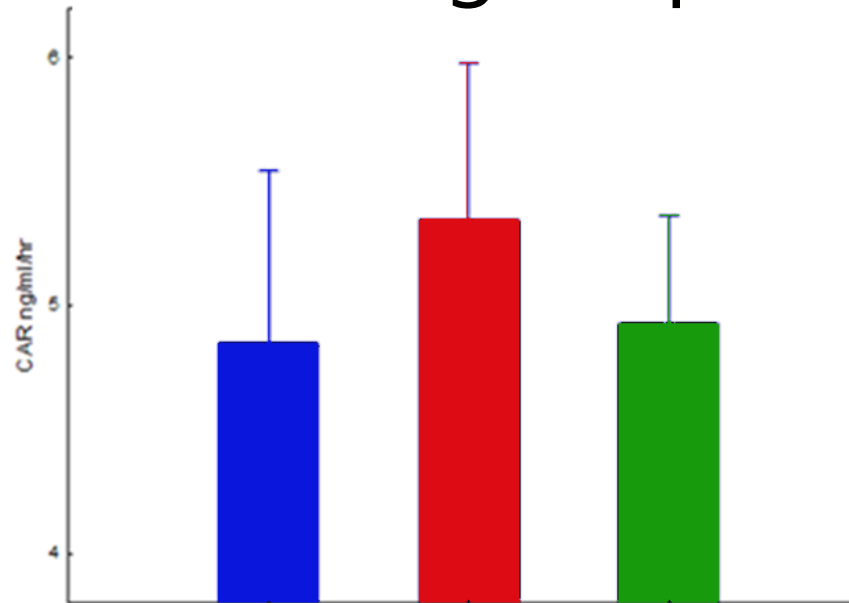
Less advantageous and safe choices in both summer and winter

Ny-Alesund Stress indices

↓ 12/12h ↓
24h Light 24h Dark

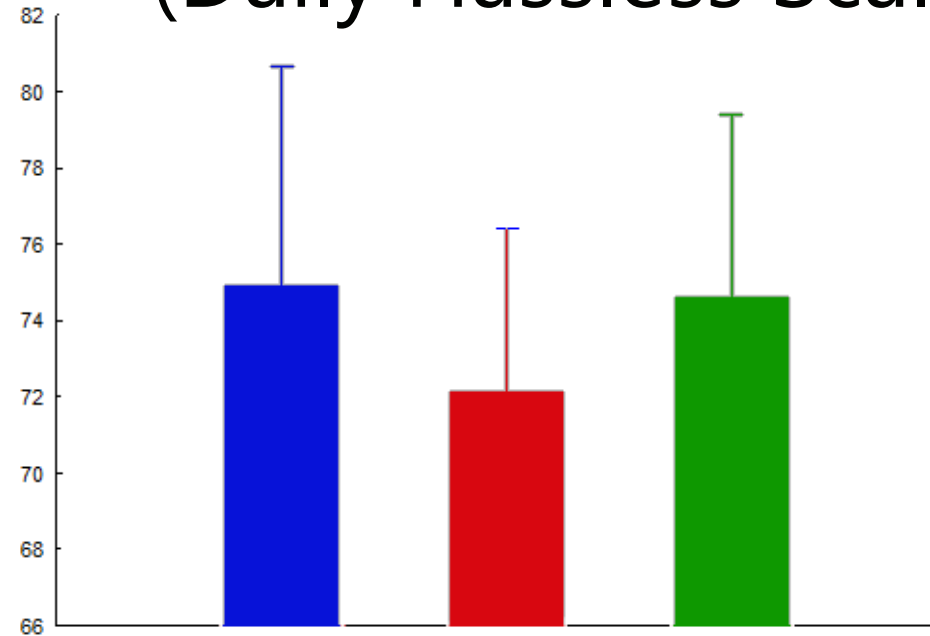
Cortisol

Awakening Response



Subjective stress

(Daily Hassles Scale)



Ny-Alesund

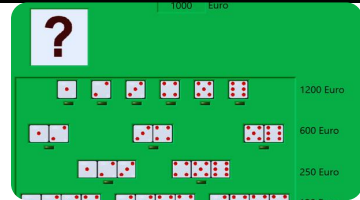
Type 2

24h Light

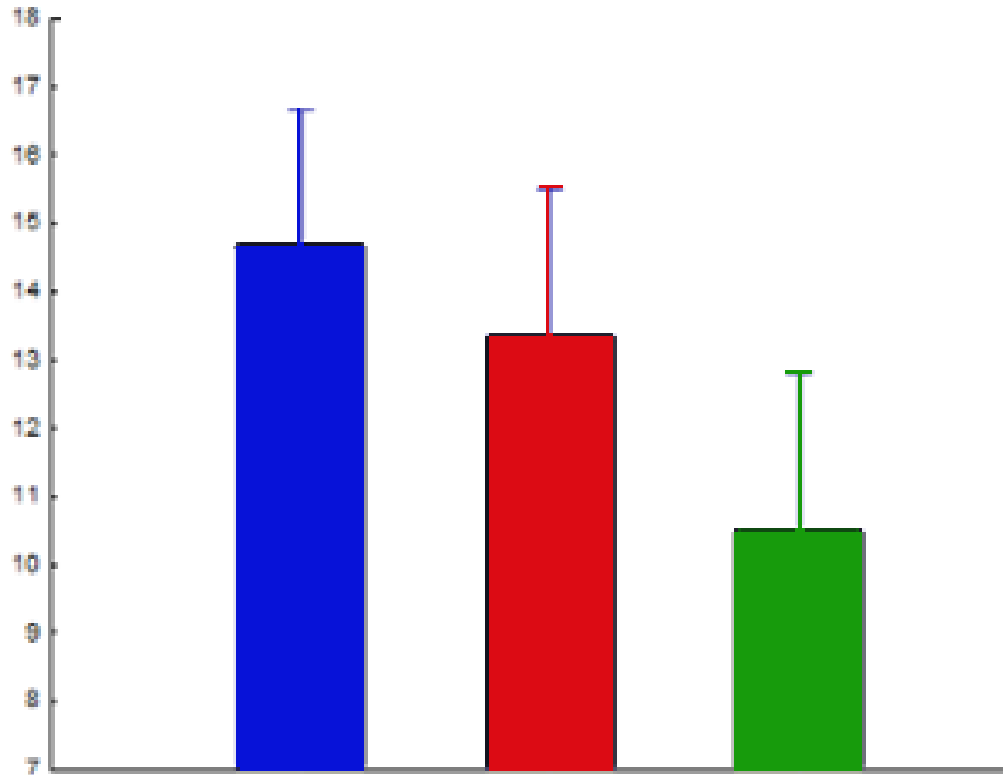
12/12h



24h Dark



GDT



Less safe choices
in winter

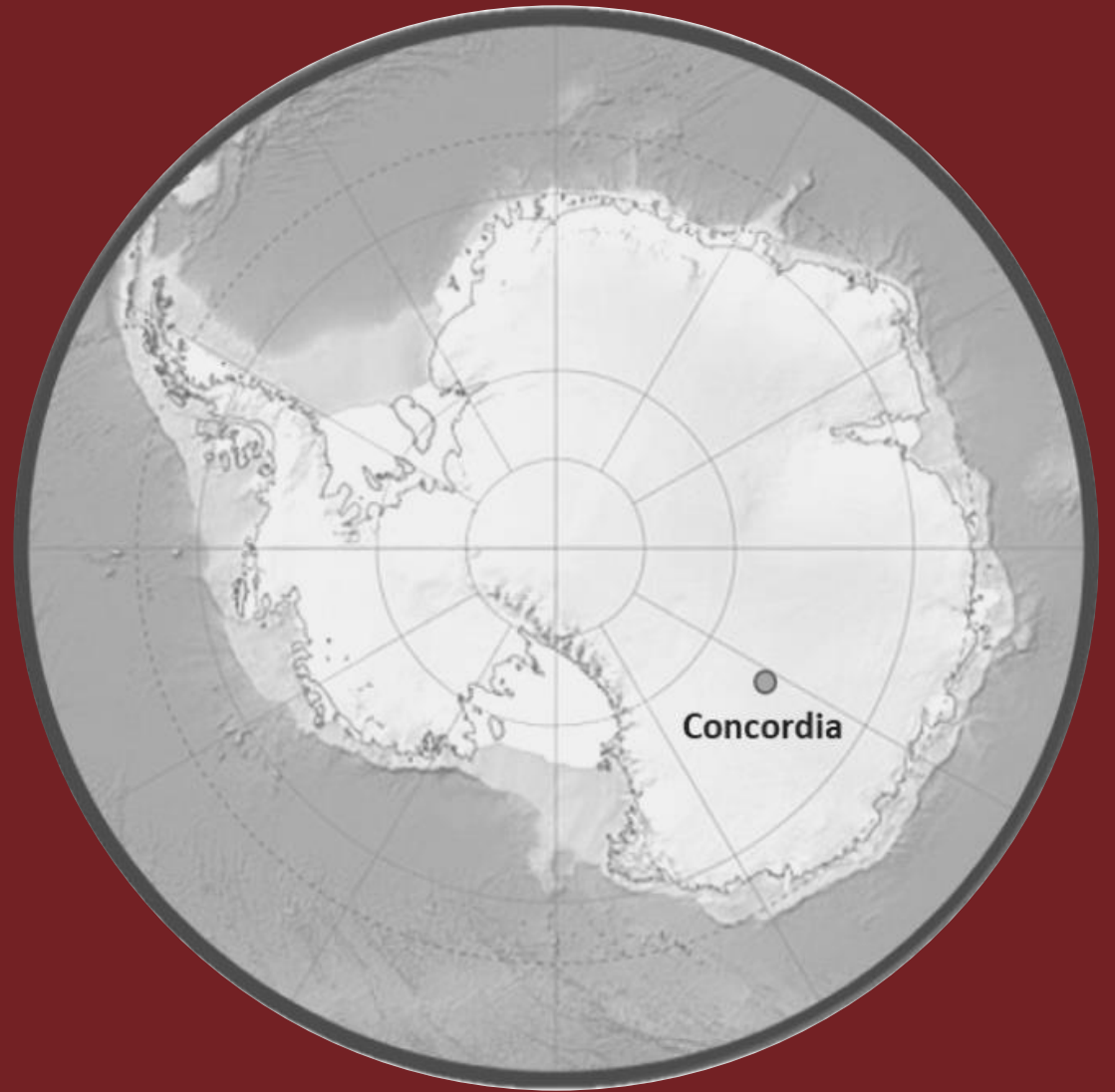
Type 1 decision-making processes were more affected than Type 2 processes during altered photoperiods.

This effect appears to be related to stress.

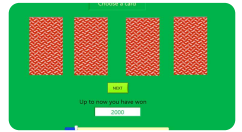
Concordia

75°S - 3223m a.s.l.

Antarctica

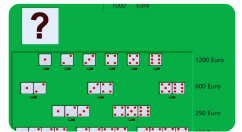
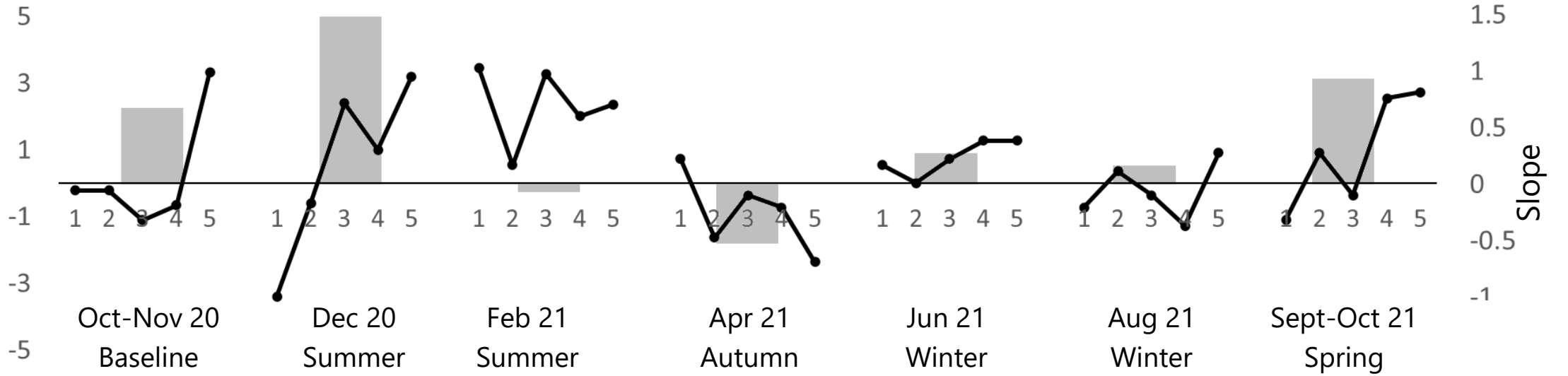


Concordia – WO21-WO22



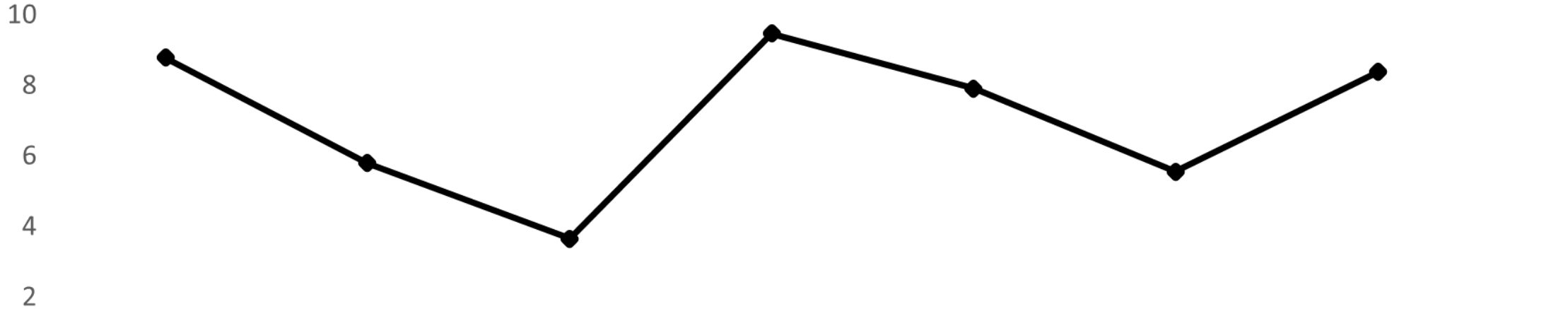
Net Score

IGT



Net Score

GDT



PRECISION PSYCHOLOGY

To identifying the impact of the different environments on the psychological domain adopting a coordinated, integrated, and translational approach (**theory and methods**)

Understanding the short- and long-term effects of space mission upon cognitive, affective, and psycho-social processes, including the inter-individual variability.

PRECISION PSYCHOLOGY

To develop training programs, habitat architecture, procedures and tasks, effective countermeasures (e.g., AI, VR)

To investigate the efficacy of potential intervention programs for the treatment of cognitive and memory dysfunctions associated to space mission-related stress in humans and in animal models

Grazie per l'attenzione