

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
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Author: Ms. Barbara Le Roy
France, barbara.m.le.roy@gmail.com

Prof. Charles Martin-Krumm
France, charles.martinkrumm@gmail.com

Prof. Marion Trousselard
Université de Lorraine, France, marion.trousselard@gmail.com

THE EAGLE HAS LANDED: EVIDENCE OF THE NEED TO ASSIST SPACE TOURISTS TO
OUTER SPACE**Abstract**

Introduction. At the edge of space tourism, walking in the steps of Neil Armstrong has never been more real. Future space tourists will have to face the harshness of the environment, especially the travel that will induce repeated gravity changes and to adapt quickly for their own safety. This issue raises the question of preparation and the impact of such a journey on novice populations who have not been selected for their psychophysiological abilities. One critical physiological system might be the parasympathetic system that underlies interoception and adaptative behavior. The objectives of the study are (1) to investigate the impact of a travel on human health using a parabolic flight experience; and (2) to assess recovery from this experience one week later.

Method. Seventeen healthy participants were enrolled in the 78th microgravity ESA Parabolic Flight Campaign. Psychophysiological, and sleep responses were measured the day before the 4h-flight (baseline), the morning before boarding (pre), the afternoon after landing (post), the tomorrow morning (recovery D+1) and one week after the flight (recovery D+7). Subjects were allocated to two groups according to their parasympathetic activation (RMSSD) profile at baseline: high parasympathetic (HP) and low parasympathetic (LP).

Results. The flight experience maintains a high level of interoceptive awareness in HP compared to LP. On the opposite, the HP voluntarily tend to ignore or distract themselves from sensations of pain or discomfort compared to LP. All flyers have a better heart rate variability in both linear and non-linear components and perceived less stress at postflight. This is more pronounced for the HP. Results at recovery reveal a critical period. Flyers voluntarily tend to ignore or distract themselves from sensations of pain or discomfort and have a significant drop in positive affect and a significant increase in negative affect (D+1 and D+7). This is particularly true for HP profile compared to LP. Flyers' sleep activity highlights a decrease in sleep efficiency while their perception of sleep quality increased (D+1), except for the HP that detect sleep decrements (D+7).

Conclusion. These results highlight the need to prepare and take care of the spatial tourists before and over several days for the return after a space travel, with potential detrimental consequences on daily lives.

Keywords: Adaptation, Parasympathic, Sleep, Parabolic flight, Space tourism