

HUMAN SPACEFLIGHT SYMPOSIUM (B3)  
Interactive Presentations (IP)

Author: Ms. Sophie Goemaere  
Ghent University, Belgium

Prof. Maarten Vansteenkiste  
Ghent University, Belgium  
Dr. Stijn Van Petegem  
Switzerland

A DEEPER INSIGHT INTO THE PSYCHOLOGICAL CHALLENGES OF HUMAN SPACEFLIGHT -  
THE ROLE OF UNIVERSAL PSYCHOLOGICAL NEEDS

**Abstract**

For reasons of safety and bureaucracy, astronauts on the ISS are provided with excruciatingly detailed instructions and a lack of decision-making power, even for simple routine tasks. Besides being time-consuming, many astronauts report feelings of demotivation, irritation, and even defiance against this working method. Anecdotic evidence suggests that this method leads to situations where astronauts read instructions diagonally or avoid checking in with Mission Support, thereby ironically increasing the risk of error making. Although several space experts have raised the alarm about these recent tendencies, some space agencies remain strongly inclined to keep a very tight grip on astronautical work procedures, even when planning for future interplanetary missions. To address this issue, we rely on and expand Self-Determination Theory (SDT), a macro theory of human motivation and well-being that has gained increasing attention over the past fifteen years (Goemaere, Vansteenkiste, Van Petegem, 2016). Central to SDT is the postulation of three universal and innate psychological needs, namely the need for competence, autonomy and relatedness. When satisfied these needs foster task pleasure, cooperation, and well-being. Instead, when these needs get frustrated, negative affect, defiance and malfunctioning arise. Consistent with SDT, dozens of studies have shown that need satisfaction relates positively to motivation and well-being, while need frustration predicts defiance and ill-being. We put forward the hypothesis that certain aspects of the current work environment of astronauts on the ISS can give rise to need frustration of autonomy and competence, which could explain the reported feelings of demotivation, irritation and defiance. We back up our theoretical claims with data gathered from HI-SEAS missions 1 and 4, showing a clear relationship between daily need satisfaction and frustration, and measures of psychological well-being, motivation, cooperation and performance. Furthermore, a laboratory experiment, in which certain characteristics of typical astronautical tasks were simulated, provides empirical evidence for the detrimental effects of redundant instructions on psychological well-being, motivation and even performance. These observations point out the paradoxical effect of increasing instructions for the sake of safety, and raise the question how work procedures can be developed such that these motivational deficits can be circumvented.