

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Behaviour, Performance and Psychosocial Issues in Space (1)

Author: Dr. Jean-Philippe Hainaut
France, hainaut@univ-metz.fr

Ms. Aurélie Collado
France, collado@univ-metz.fr

Dr. Cécile Langlet
France, langlet@univ-metz.fr

Dr. Vincent Monfort
France, monfort@univ-metz.fr

Dr. Benoît Bolmont
France, bolmont@univ-metz.fr

EFFECTS OF MICROGRAVITY AND ANXIETY ON SENSORY MODALITIES IN REACTION TIME
TASKS DURING PARABOLIC FLIGHT**Abstract**

Introduction. It has been shown in laboratory conditions, that state anxiety could differently influence sensorimotor tasks depending on the sensory modality. Besides, exposure to microgravity during space flight is also known to affect the sensorimotor system. Because individuals during space missions are frequently exposed to multi-stressful situations (environment, confinement, emergency situations...), we are interested in the combined effects of microgravity and anxiety on sensorimotor system. It has been demonstrated that parabolic flights, used to provide a nearly weightless environment, could induce anxiety disturbances. Thus in the present study, we used the parabolic flights to examine in an anxiogenic context the influence of microgravity on reaction time (RT) performances in different sensory modalities.

Methods. 25 right-handed male subjects (using the ETAP-0G database) performed dual-choice RT tasks in auditory, tactile and visual modalities (each modality was assessed separately). Each task was performed twice during the flight (during 1g flight and during 0g flight) and in laboratory condition. Comparisons of RT performances between laboratory condition (non-anxiogenic situation) and 1g flight allowed us to assess the effect of anxiety and perturbation related to the flight. Comparisons between 1g flight and 0g flight were used to determine the effect of microgravity.

Results. State anxiety was significantly higher in flight conditions as compared to laboratory condition but no difference was found between 0g and 1g phases. Results of dual-choice RT tasks have shown performance decrements in 1g flight compared to laboratory condition whatever the sensory modality. In contrast, performances during phase of 0g were significantly improved for auditory and visual modalities compared to phase of 1g.

Discussion. Results of dual-choice RT tasks suggest that anxiety and perturbation related to the flight condition impair the process of decision making, whatever the modality. Surprisingly, despite the anxiogenic context of parabolic flight, microgravity seems to counteract the adverse effect of anxiety on visual and auditory, but not on tactile modality. We hypothesise that microgravity and/or specific emotional changes that are associated with microgravity, could have a modality-specific effect. We suggest that the tactile modality, because of its particular characteristics, would not be sensitive to this specific effect. The present data could have implication for future adaptation of environment in terms of information transmission modality in microgravity condition.

We thank CNES (French Spatial Agency) for their financial support.