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SPACE AND HUMAN ETHOLOGY IN THIRTY KEYWORDS

**Abstract**

Introduction: Humanity has been evolving on Earth based on personal, social and cultural practices. For future exploration of other planets, during long-term stay on the moon or round trip voyages to Mars, crews are expected to develop a multi-system adaptation while in space and develop a micro-society evolving from earthly experience, with its own features and new strategies. Since our start 30 years ago, the overall objectives of Ethospace have been to investigate behavior in all its facets, be it motor or collective activity in orbital missions or experimental settings. Our working hypothesis is that the optimal relationship between the environment and the individuals' behavioral occurrences are positive indicators of the adaptive dynamics. Methodology: We applied the tools of human ethology to a broad range of situations and simulations (e.g., bodily tasks, daily life activities, extra-vehicular activities) to give quantitative descriptions of the behaviors in an exhaustive way. We have made observations in real flights (e.g. space shuttle, parabolic campaigns) emphasizing the absence of terrestrial gravity, and in a set of paradigms (e.g., Mars-500, CELSS, SIRIUS) and analogs (e.g., MDRS, Concordia) emphasizing the impacts of isolated and confined environments. Results: The most relevant findings are that heterogeneity of crew composition, interdependency of contextual and temporal factors, variability of behavioral events, predictivity of behavioral indicators, ability of languages, and crewmembers' interactivity are components to be considered in manned exploration mission scenarios. Conclusion: Thirty keywords offer an overview of discussions. Adaptation, spaceflight, isolation, confinement, simulation and interdisciplinary define the scope of studies. Interplanetary and optimization state the assumption of mission success. Sociality,

novelty, autonomy and integration establish the theoretical framework. Behavior, observation, description quantification and visualization define the method. Expressions, communications, interactions, actions, duration, periodicity, referential, multi-national, mixed-gender, individuality, synergy and salutogenesis summarize the outcomes. Humanity in deep space and deep time is the challenge.