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Simulating Space Habitation: Habitats, Design and Simulation Missions (6)

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NATURE SHOULD BE COLORFUL! WHEN BIONOMIC ENHANCEMENTS TRIGGER THE DESIRE FOR MORE: PRELIMINARY RESULTS FROM SIRIUS-23

Abstract

Natural elements are restorative and highly desirable in built environments. Convergent research from evolutionary psychology and externalized cognition successfully demonstrated that the biological fractal structure of an environment can build on innate perceptual, cognitive, emotional and psychosocial evolutionary affinities associated with creative thought, stress reduction, performance, and personal emotional management. This biologically based 'biofractal hypothesis' of effects offers a countermeasure design strategy of significant power and flexibility, especially for Isolated and Confined Environments (ICEs) such as those faced by long duration space crews.

DESIGN and METHODS: A study to evaluate the efficacy and effectiveness of specific bionomic interior design elements to buffer stress, improve performance, and enhance cognition, psychological functioning, crew well-being and cohesion in crews was implemented in SiRIUS-23, a 12-month isolation experiment. Stimuli were grey scale printed images with selected biofractal ranges (1.3 - 1.5 dimensional range (D)) at two exercise locations, workstations and in personal quarters. Six weeks into the study, a major deviation from the study design provided some interesting qualitative insights into the reception of biofractal visual elements by crewmembers. Perceiving the greyscale images as 'boring', one crewmember manually colored the images in their private quarters. Methodologically, this produced an inequivalent condition (colored versus non-colored) that may have affected the individual's response to the noncolored versions at the exercise and workstation locations.

RESULTS and PLANNED ANALYSES: Study data has only recently been released by the IBMP. In addition to the original analyses exploring differences between the different images, analyses will also be conducted with and without the deviating crewmember's data. Qualitative methods examining pre/post comparisons of individual and group exercise data may yield insight into the impact of colored versions versus the greyscale versions. IMPLICATIONS: The fact that the lack of color in scenes of nature was aversive enough to cause a volunteer test subject in an environment dedicated to experimental assessment to autonomously alter one of the testing conditions is noteworthy. The rationalization that it was 'ok' to alter the set in the personal quarters because they were private and did not affect other crewmembers

is also an insight into the perception of permissible use of private spaces. Qualitative exit interviews will specifically focus on perceptions and significance regarding the absence of color in the test images. Future studies must actively consider whether color is an additive or essential component in the beneficial contribution of biofractals elements to enhanced cognition, restoration and psychological well-being.