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Behaviour, Performance and Psychosocial Issues in Space (1)

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EXPLORING THE RELATIONSHIP BETWEEN CREW INTERPERSONAL DYNAMICS AND
MENTAL WORKLOAD: SIRIUS-21

Abstract

Human relationships are critical to the success of crews and missions in space. Landon et al., (2016) reported that team cohesion leads to improved performance. Other study has shown that teams with high levels of interpersonal conflict can be as much as 60-70 percent less likely to complete tasks (Kass' et al., 1996). In this study, we considered the objective evaluation from other crew members by Sociometric test, and the subjective level of workload obtained by NASA-TLX. The purpose of this study was to investigate whether an individual's perceived workload relations objective evaluations from others, in an isolated, confined environment for long periods. By clarifying the relationship between these two indices, we aimed to quantify human relationship problems in the future isolated, confined environment and explore their causes.

The study was conducted at SIRIUS (Scientific International Research In Unique Terrestrial Station), an international isolation experiment. A 240-day isolation experiment was conducted with six participants. One participant left on day 33, and the study continued with five participants thereafter. The indices were performed six times: before entering the isolation facility, four times during admission, and after leaving. Sociometric test is a questionnaire that asked two questions: "the person who you want to be with" and "the person who you do not want to be with." These questions were asked in situational settings of "while doing a task" (Task-related) and "while eating or chatting" (Private). The ISSS (Social Status of the group index), which represents the social position of an individual in a group, was calculated from the responses to the test. NASA-TLX is a questionnaire of mental workload. This scale includes the six subscales: mental demand, physical demand, temporal demand, own performance, effort, and frustration. This calculates the scores for each subscale and the total score, WWL (Weighted Workload).

Results showed significant negative correlations between WWL and ISSS in both task-related and private cases ($r = -0.601$, $p < .01$; $r = -0.429$, $p < .05$). Only Effort showed a significant negative correlation among the subcategories. This implies that a high workload is not viewed well by other crew members. Since there are individual differences in the way workload is felt, tailor-made work allocation that takes characteristics into account and self-care and peer support education for coping with mental stress are considered necessary. These results suggest that workload support may have a positive impact on crew members' impressions of each other and group dynamics.