

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

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THE LEADERSHIP ROLES IN CELSS-180 INTEGRATION EXPERIMENT

Abstract

Crewmembers may experience impaired mood states and monotony over time in Isolated, Confined and Extreme environment. Leadership played an important role in moderating group cohesion, task arrangement and performance. Previous studies summarized characteristics of leadership including task concentration, high responsibility, sensitiveness for crewmembers and team cohesion. During early stage, leader intend to be a controller to arrange duties and tasks, but the supportive part would gradually increase to offer affective support and boost morale. Outside supervisors also have interaction with crewmembers. Crewmembers may be apt to ask for autonomy over time to apart from outside controllers, but supportive interactions from outside supervisors are necessary and helpful for long-term experiment.

In present study, we tried to analyze the leadership roles showed in analogue space station named “4 Subjects 180 Days CELSS Integration Experiment”, which was conducted at Shenzhen of China from June to December of 2016. To test leadership roles and strength of supervisor support, WES and GES questionnaires were applied 15 times separately during the whole experiment, including 1 pre-test, 13 tests on the mission, and 1 post-test. Non-parametric analysis was used in analysis to circumvent with small size sample.

We compared the result of scores of supervisor support, a subscale of WES, during experiment and pre-test as well as post-test. Friedman test revealed that the perception of supervisor support in post-test significant higher than pre-test after experiment($\chi^2=6.500$, $p=0.039$; post-hoc test pre- post=-1.750, $p=0.040$). In addition, crewmembers reported that they felt more supervisor support during experiment compared with pre-test although not significant. However, Friedman test of three quarter during experiment did not reveal significant difference, but scores during Mars-time (P2) slightly decreased compared with other two phase of Earth-time(P1 and P3). Two subscales of GES measured the different leadership style of team leader, support and control. Via Wilcoxon-test, we compared leader support and leader control percept by crewmembers, the results revealed that the perception of leader support significant higher than leader control (Mleader support=8.37, SD= 0.416; Mleader control=6.92, SD=0.373; $Z=-3.192$, $p=0.001$). This may indicate that the leader-style in experiment was more apt to support and help others, rather than simply controlled for efficient management.

We also examined phase difference of leader support and leader control, however there was without significant outcomes. Nevertheless, Spearman coefficient showed negative correlation between leader support and time ($r=-.776$, $p=0.002$), which may suggest impaired perception of leader support due to negative

influence of isolated and confined environment.