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EFFECTS OF 72H SLEEP DEPRIVATION ON SUBJECTS'S COGNITIVE ABILITY

Abstract

Under the influence of spaceflight stressor, such as micro-gravity, isolation and confinement, astronauts may experience cognition lesion, anxiety, restlessness and hostility, etc. It may do harm to crew's health, affect the complement of space mission, and even threat the safety of spaceflight. Experiment in narrow, isolation, confinement and high workload condition can partly mimic the spaceflight environment. Through these experiments, individuals' physical and mental function were observed and relevant measurement to protect astronauts' mental health can be studied. **Objective:** To study the influence of sleep deprivation, narrow, isolation, confinement and high workload on subjects' cognitive ability and its mechanism. **Methods:** After physical and mental assessment, 18 health male adult volunteers, 20-30 years old, were selected. They were distributed to 6 groups randomly, 3 men per group. Informed consents were assigned before experiment training. During experiment, the crew stayed in specialized lab. It is well-ventilated, and insulated from the external sound, light and vibration; also the temperature and humidity were set to a comfortable degree. Reaction time test, Stroop color word test, time span and distance justification test were conducted according to the 72 hours schedule. **Results:** Reaction time became longer at the later period of the experiment ($P<0.05$). Stroop color word test showed that the ability to distinguish mismatch word and color became weaker ($P<0.05$). Time span and distance justification ability did not seem to be affected. Cognitive ability changes correlated with circadian rhythms, in other words, the reaction time and the other cognitive ability was better during the day than night. But the difference became more and more insignificant following the sleep deprivation. **Conclusions:** Under the combined influence of sleep deprivation, narrow, isolation, confinement and high workload, individuals' reaction ability and distinguish ability of un-matched information were injured; Cognitive ability changes correlated with circadian rhythms, but the difference became weak gradually.

Keywords:manned spaceflight, mental assessment, isolated and confinement environment(ICE), sleep deprivation, high work load, cognition