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HOW DECISION MAKING LESSONS FROM THE ANTARCTIC CAN BE APPLIED TO MARS
MISSIONS

Abstract

This paper reviews the psychosocial adaptation of crewmembers during Antarctic expeditions during the Heroic Era of Antarctic Exploration (1897 – 1922) and explains how lessons learned during this era may be applied to missions beyond Earth orbit. The review identifies key characteristics and determinants of human adaptation to the Antarctic environment by crews of expeditions such as the Belgica Antarctic Expedition, (1897-1899), the Australasian Antarctic Expedition (1911 – 1914) and the Imperial Trans-Antarctic Expedition (1914 – 1917). The review evaluates the commonalities (such as physical conditions, habitability, crew characteristics, mission attributes) between crews of expeditions of the Heroic Era of Antarctic Exploration and future interplanetary crews. Characteristics of isolated, confined, extreme (ICE) environments have been of considerable interest to mission planners for many years now. One reason for this interest is the high likelihood that crewmembers working in an ICE environment will react differently than they would in a normal environment because of the stressors that an ICE environment imposes on those who work there. Evidence of these reactions can be found in myriad research studies that have replicated ICE environments; these studies have observed large number of subjects failing to complete even a few weeks of confinement due to perceived high stress, yet crewmembers participating in expeditions during the Heroic Era of Antarctic Exploration were able to deal with much harsher conditions with little to no adverse reaction or disruption. Although Antarctic expeditions and future space missions beyond Earth orbit are distinct in many aspects, both types of missions share commonalities. These commonalities include the harsh physical surroundings, the dangers of working in an ICE environment, the exposure to thermal extremes, the difficulties of evacuation, and the necessity to interact with small groups of individuals working and living in close quarters. Given these commonalities, the variables of early Antarctic expeditions can be viewed as a space analogue, which means much can be gleaned from rigorous analysis of the Antarctic expeditions that took place in the Heroic Era of Antarctic Exploration. From this analysis it may be possible to determine and identify strategies that enable crewmembers to successfully work and live in an ICE environment and thereby develop guidelines and strategies for missions beyond Earth orbit.