

EFFECTS OF MILD HYPOTHERMIA ON DIVERS' PERFORMANCE

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The present paper reviews the data of the effects of mild hypothermia on the diver's cognitive functions performed underwater. A diver while working underwater has to apply his/her terrestrial skills to adapt, cope and survive the aquatic circumstances. Underwater, the development of hypothermia is a metabolic but also a physiological process which depends on the water temperature, a duration and depth of the submersion, the effectiveness of the insulation, and the respiratory heat loss. Heat loss which apparently affects the state of the sensory systems can be restored by metabolic heat production which can be induced by the diver's physical activity.

The results of the cold effects on performance are not systematic either on the dry land or underwater. Several studies on the diver's performance while submerged in cold water (under 10 °C) have shown decrement in manual dexterity, accuracy and speed, impairment of memory in verbal-recall tests, in word recognition, in arithmetics, and in logical reasoning. Some studies have found no cold-induced impairment of vigilance or sustained attention, reaction time, or reasoning in water but on the dry land. Also no cold effects were observed on digit span, verbal reasoning but on time estimation, vigilance, verbal memory, and arithmetics on the dry land but not in water. Some of these negative influences of cold like impaired word recognition were found to be associated with a drop of core body temperature or rectal temperature while no relationship was found to performance in the other tests.

Both arousal and distraction effects of cold have been served for explanation for the findings. The conflicting results, however, suggest that the arousal and distraction explanations may not be adequate enough. Cooling changes the sensitivity of the somatosensory system. Cold also appears to affect the auditory sensory system by elevating hearing thresholds. How a drop of temperature affects the state of the visual sensory system, or the brain functions underlying sensory information processing are not clear. It appears that in the future research, in addition to the arousal and distraction assumptions more a cognitive psychological approach with a psychophysiological model related to sensory information processing are needed for better understanding the effects of cold stress on human cognitive and mental processes.