Title: Mental performance during submaximal exercise in 13 and 17% oxygen

Authors: Knight, DR
Schlichting, CL
Fulco, CS
Cymerman, A

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Abstract: Submarine crews live in atmospheres containing variable levels of O2 and CO2. Under these conditions, significant reduction of the O2 may impair mental function during physical exertion. Therefore, psychomotor performance was measured in exercising men during Hours 26 and 57 of exposure to 21, 17, and 13% O2 in a hypobaric chamber (each gas contained 0.9% CO2, balance N1). Sea-level pressure was used except when reduced to 576 Torr at Hour 57 in 17% O2 (hypobaric-17% O2). At Hour 26 the subjects exercised at 35 and 65% of predicted VO2max They were hypoxic during exercise in 17 and 13% O2, as indicated by reduced SaO2 values (P less than 0.05). The psychomotor test (timed arithmetic) was affected by the exposure condition (P less than 0.05) but not by the work rate. At Hour 57, subjects repeated the arithmetic task at rest and at 65% of predicted VO2max. SaO2 was reduced in hypobaric-17 and 13% O2 (P less than 0.05). The math scores were affected by the work rate (P less than 0.05) but not by the exposure condition. From post-hoc analyses we conclude that 17% O2 does not impair the timed arithmetic task during submaximal exercise at normobaric pressures.

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