Physiological and psychological reactions of sub-tropically acclimatized subjects exposed to different indoor temperatures at a relative humidity of 70% - DTU Orbit (10/09/2019)

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Thermal comfort, self-reported acute health symptoms, cognitive performance, and physiological reactions were examined at four temperatures (26, 30, 33, and 37°C) at a relative humidity of 70%. Thirty-two sub-tropically acclimatized subjects experienced each condition for 175 minute, in balanced order, in a climatic chamber. The perception of heat gradually increased with increasing temperature, but the subjects felt hot only at 37°C. The temperature of 33°C was on average rated as acceptable and only just uncomfortable. The acceptability of air quality decreased linearly with increasing temperature. The intensity of acute health symptoms reported by the subjects increased with increasing temperature, but it was no more than moderate even at the highest temperature; dryness of skin and eye were alleviated. The eardrum temperature, skin temperature and moisture, heart rate, end-tidal carbon dioxide, and weight loss increased significantly with increasing temperature, whereas the percentage of adjacent heart inter-beat intervals differing by >50 ms decreased significantly. These results suggest that the perceived heat, self-reported symptoms, and physiological reactions occurred concurrently. They show additionally that acclimatization to heat may shift the boundary of thermal discomfort to a higher temperature. The role of psychological adaptation and of the contextual aspects of this process still requires clarification in future experiments.

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