An experimental study of the effect of different starting room temperatures on occupant comfort in Danish summer weather

As office workers will usually have a slightly elevated metabolic rate when arriving at work, they may prefer a room temperature below the comfort range for sedentary activity in the morning. This possibility was studied in an experiment with 25 young people, male and female, exposed to four different conditions. Each condition consisted of two sessions, the simulated commute (activity equivalent to walking to work) and the office session. Each office session had a different starting room temperature, namely 18.5°C, 20°C, 21.5°C or 23°C, followed by an increasing temperature “ramp” of 1.5K every 30 min. During the last 30 min the temperature remained constant. Physical measurements were continuously recorded and subjective evaluation questionnaires were completed every 30 min. It was observed that, upon arrival at the office-lab, a room temperature of 20°C provided a thermal environment with neutral thermal sensation (0.23), low thermal dissatisfaction (8.6%) and a high level of thermal comfort for the whole body (3.3). It was concluded that, in the cooling season, to improve the thermal sensation of occupants, a lower temperature than is suggested by the existing standards should be maintained in the early office hours, and that this will lead to a lower maximum room temperature during the day, which would result in less demand for cooling during the summer period.

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