An experimental study of thermal comfort at different combinations of air and mean radiant temperature

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It is often discussed if a person prefers a low air temperature (ta) and a high mean radiant temperature (tr), vice-versa or it does not matter as long as the operative temperature is acceptable. One of the hypotheses is that it does not matter for thermal comfort but for perceived air quality, a lower air temperature is preferred. This paper presents an experimental study with 30 human subjects exposed to three different combinations of air- and mean radiant temperature with an operative temperature around 23 °C. The subjects gave subjective evaluations of thermal comfort and perceived air quality during the experiments. The PMV-index gave a good estimation of thermal sensation vote (TSV) when the air and mean radiant temperature were the same. In the environment with different air- and mean radiant temperatures, a thermal comfort evaluation shows an error up to 1 scale unit on the 7-point thermal sensation scale. The study could not confirm any preference regarding air and mean radiant temperature.

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