Colour associated thermal perception: Manifestation and contributing factors with reference to red and blue

A.A.Hettiarachchi[1], T.K.N.P. De Silva [2]

Theory of colour, a long-established tradition of artists and painters, distinctly differentiates a duality between the impact of warm and cool colours on human beings. The lack of scientific and statistically substantiated knowledge on aforesaid colour associated thermal perception (CTP) deems to hinder its optimum integration in built environment.

Current interdisciplinary investigation seeks scientific explanation on the nature of manifestation and contributing factors of CTP with reference to a warm colour (red) and a cool colour (blue). Exploring parameters of three different disciplines, hypothesized potentials of CTP to manifest as a psychological response, a biological response altering core body temperature or an actual thermal sensation caused due to heat radiation emitted via coloured surfaces were tested. A crossover experiment was executed with a sample of healthy, normal sighted, male undergraduates (n=111) selected via stratified simple random sampling (age 19 – 30) using two colour workstations (red and blue) under controlled laboratory conditions.

CTP was rated in a 5- point Likert scale while the induced feelings, emotions and preference to each colour treatment were recorded via a questionnaire survey. Temporal artery temperature (TAT) of subjects and the surface temperature of work stations (SFT) were recorded through infrared thermal monitoring.

Substantiating colour theory, subjects demonstrated a propensity to perceive red as warm/hot (64.2%) and blue as cool/cold (59.3%). Complex sampling ordinal logistic regression model testing the significance of 18 parameters revealed that CTP neither manifests due to a fluctuation in core body temperature nor as an actual thermal sensation. CTP is a psychological response characterized by common as well as colour specific factors. CTP of both red (RTP) and blue (BTP) were statistically explained by the psychological states induced by each colour, pre-conceived learnt ideas influenced by education, and subjects' preference. One's favorite colour and religion were found to be influencing RTP while age and surface temperature of the applied colour influenced the BTP.

Based on the revealed nature of manifestation, integration of CTP in built environment to psychologically manipulate the perceived thermal environment to achieve the desirable thermal milieu is highly recommended.

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1 Department of Architecture, University of Moratuwa, Sri Lanka. anishka_h@yahoo.com

2 Department of Architecture, University of Moratuwa, Sri Lanka tknpdesilva@gmail.com