



Human Thermal Perception in Arid Climate: Methods, Location, Gender and Cultural Background Perspective, the case of Beer Sheva, Israel

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In the early 2000's, increased attention was focused on urban outdoor thermal conditions for city inhabitants as a new field of research aiming to provide strategies for sustainable urban planning. Since the beginning of the 21st century, examination of thermal indices by subjective perception became a methodical tool in order to achieve this aim. So far, over 100 studies tried to assess human thermal perception by investigating in-situ thermal conditions versus subjective thermal perception. A literature review of these studies identified 20 peer-reviewed studies that were conducted in arid and semi-arid climatic zones through the years 2001-2018. Out of these studies, only five studies have exhibited the neutral thermal sensation range for arid and semi-arid climatic zones, and only one study tried to modify the human thermal perception scale for arid zone. It seems that there is a lack of studies that investigated the human thermal perception in arid zones. Therefore the objective of this study is to expand understanding on human thermal perception in an arid city.

The study was conducted in the city of Beer Sheva, which is located in the hot and arid climate of southern Israel. The population is estimated at 205,000, which includes 15,000 inhabitants whom immigrated since 2001, mainly from Eastern Europe.

Climatic measurements were taken during different seasons (winter, spring and summer) between the years 2010-2015 in different location inside the city. A questionnaire survey of random passersby's was conducted during the field measurements, collecting 2,500 responses.

The aims of this study were: (a) to evaluate the human thermal perception in varied outdoor urban spaces during the summer and winter season in an arid city, compared to findings in other arid climates, (b) to modify the human thermal perception scale for PET and UTCI indices for the city of Beer Sheva (c) To analyze the differences in subjective thermal perception between gender and between native city inhabitants and those whom immigrated to the city.

The findings show that in general the range of the neutral thermal sensation in arid zones is wider than in other climatic zones. From the gender perspective, females shows a higher sensitivity to cold thermal conditions, and people from an Eastern European cultural background showed a higher tolerance towards cold conditions and higher sensitivity to hot conditions in comparison to those whom are born and raised in the arid urban conditions.