

Under the Urban Sun: Linking Subjective Thermal Perception to Occupational Heat Exposure of Lifeguards

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Background

Heat exposure is routinely encountered by lifeguards; whether working pool side at aquatic centers with high humidity levels and fluctuating airflow, or working outside with prolonged sun exposure and high surface temperatures. These factors heighten the risk of dehydration, exhaustion, and other heat-related health effects. To inform better occupational prevention and safety strategies this ancillary study seeks to facilitate an understanding of the relationship between the lifeguards' subjective thermal perception and objectively measured occupational heat exposures. The interpretation of the self-reported data utilized in this study should be acknowledged with the consideration of individual differences in heat tolerance and operational workload factors. The variability in task demands, staffing models, shift duration, and emergency response activity across the site locations may have influenced the individual's overall perception and experience of personal thermal exposure.

Research Questions

Do lifeguards' perceptions of heat and humidity align with measured environmental indicators of heat stress in Ontario urban aquatic environments?

Can lifeguards' self-reported heat stress perceptions serve as reliable indicators for proactive heat-related risk management strategies?

Methodology

Data Collection:

(*The analysis conducted for this project employed data from the primary research study, used with the author's formal consent*.)

- Quantitative/ Objective Data ~ Site visit thermal environmental conditions.
  - Environment Canada weather and climate historical data https://climate.weather.gc.ca/index_e.html
  - Wet Bulb Globe Temperature monitor (WBGT)
- Qualitative/ Subjective Data
  - Lifeguard participant surveys; the extracted data pertains to physical comfort and perceived humidity.

Data Analysis:

- Microsoft Excel - preliminary daily and site visit weather and climate comparisons.
- IBM SPSS Statistics - visual graphics and frequency analytics .

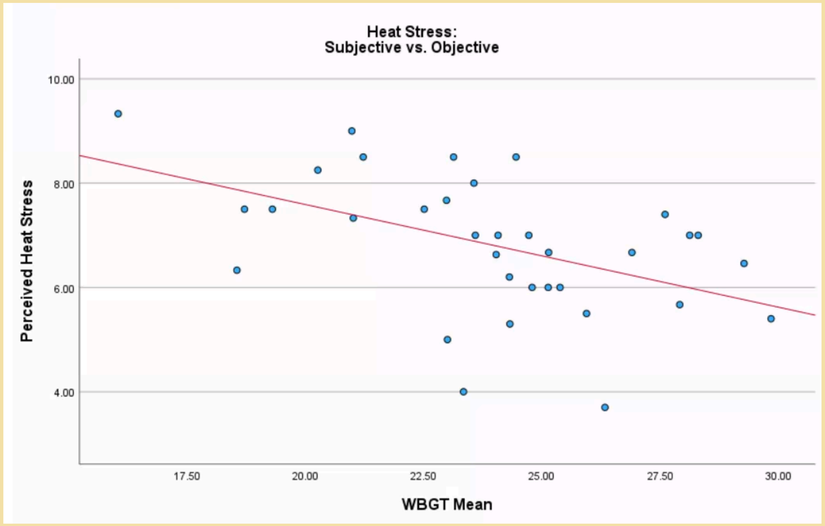
Data Analysis & Key Findings

Heat Stress Comparison

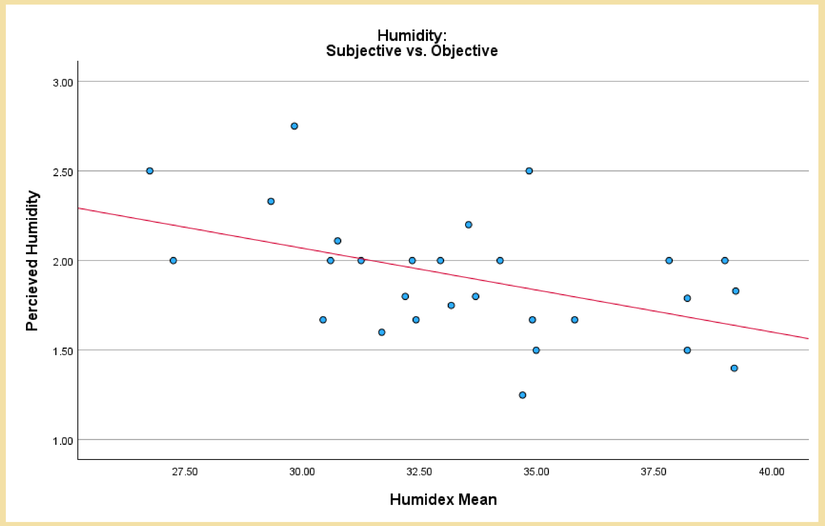
- Site location temperature means (x-axis) were plotted against averaged site location comfort perception values (y-axis).
- Indicated perceived heat stress levels have a strong correlation with temperature data, by producing a negative linear result.
- Perceived heat stress rating was expressed through the following value range; 1 = extremely uncomfortable, to 10 = extremely comfortable.

Humidity Comparison

- Site location humidex means (x-axis) were plotted against the averaged site location perceived humidity exposure (y-axis) by utilizing the converted values.
- Results indicate a strong correlation between the humidex level and the perceived humidity exposure, creating a negative linear result.
- Perceived humidity exposures are interpreted through the following values; 3 = dry, 2 = appropriate/ desirable, 1 = wet.



Spread remains consistant with the data represented along the x-axis.



Existing outliers present may be representative of potential response bias.

Potential existing research biases may include; non-response bias (questions skipped on surveys), measurement bias (all efforts were taken by researchers to minimize this through routine calibration of WBGT monitors), response bias (potential inaccurate answers or mis-interpreted questions).

Conclusion: Future Considerations

- The relationship between the participants' thermal comfort levels and the environmental conditions suggest a strong negative correlation; as temperature or humidity levels increase, individual comfort levels decrease.
- Results indicate that lifeguards' perceptions of heat and humidity align with measured environmental indicators of heat stress in Ontario urban aquatic environments.
- Analysis shows that lifeguards' self-reported heat stress perceptions may serve as reliable indicators for proactive heat-related risk management strategies.
- Based on these findings, future considerations may include the development of an evaluation tool or the adoption of a pre-existing heat stress matrix, that can be implemented as a standard for all lifeguards in Ontario.

