Review of: "How Urban Heat Islands Effect Crime: Understanding the Implications of Temperature, Population Density, and Green Canopy Cover in Shaping Built Environments"

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Reference to authors' text is generally *shown in italics*

Reviewers' comment is normal text, **sometimes highlighted in bold**

Abstract

Abstract needs to be revised thoroughly to give a systematic salient view of the entire work including introduction, methods, results, etc.

Minor observations:

- Think of **replacing** *"urban heat islands"* **with " (hot) thermal stresses"** UHI is not analyzed in this study
- The sentence "*Further, it discusses potential implications of the relationship …"* **needs restructuring** to clarify the intended meaning.
- *"… between* *patterns of criminal behaviour and thermal (dis) comfort*". **Replace "thermal (dis)comfort" with "air temperature"** since study does not deal with thermal (dis)comfort (which depends on total 6 primary and many other factors)
- *This correlation is to relate fundamental urban design principles*….. sentence **meaning** is not clear. Improve sentence formation etc.
- *Nonetheless, forecasting the future of …. environmental planning, development strategy, designers, and planners.*
- "*…. making urban communities adaptive to the impacts of global warming and future densification*" … is **too generalized** … indicate only crime related effects

Introduction

Major observation: Introduction should be improvised to start from the presentation of a general background of studies in the concerned field and progress through a synchronous literature review towards finding the research gap and hence

goals of the present research.

Minor observations:

- *"Accordingly, it is incumbent on … in relation to population growth."* **This is recommendation**, why here. Please remove it or relocate it to discussions, etc.

- *" …. and pedestrianising hard infrastructure towards to active … the propensity for crime."* meaning not clear sentence formation is wrong. what is **"reducing microclimate"**

- Para *"Many scholarly works … behaviour (Boyanowsky 2020; Mehta and Binder 2012; Wilson and Herrnstein 1998)."* Repeats environment

- *The identification of key factors that contribute to criminality in society has been a focus of previous research* – **please add some reference**

- *"Gaps and limitations in previous research are also considered, highlighting …"* **put up the gaps + significance/ uniqueness** of your study here

- *"Finally, the study uses a systematic literature review … and urban design."* This is **repetitive and rhetorical**, may be removed/ relocated to discussions section

Urban Heat Island Studies

This section may be removed, as it doesn't have relevance to the main body of your research and findings, **however,**

- *" … highlight that urban morphology plays an important role in mediating immediate micro-climate and localised thermal comfort"* …. *Applying ENVI-met 3D simulations, Rad and Afzali highlights how* **- may also refer https://doi.org/10.1016/j.scs.2021.103085, and hdl.handle.net/10603/437070**

Climate and Crime

The paras under this sub head are provided in a way that is more a scattered tale of different past research findings. These should be 'tied' up to 'extract' and distinctly present the gaps in the previous researches, followed by your research questions/ objectives etc.

Moreover, following paras look out of context

- *"Many vulnerable communities are already impacted ….. sustainable approach at local and national levels"* --- **This para is about adaptation, not a topic dealt with in your research hence not required**

- *Poorly constructed urban places where …. that improve safety perception and reality (Jacobs 1961, Newman 1977).* **this para is about urban planning guidelines - why required here?**

Methodology: Case Study Development

Online reviews from Suburb Reviews of the Australian Real Estate Search seems to be an open ended interview

concerning the livability characteristics of Midland**. This can be only used for giving a qualitative outline of the place.**

Method Design

"Mean monthly temperature data for the study were extracted from the Bureau of Meteorology (2022)"

……….and……………. "Monthly crime statistics were taken from January 2007 - December 2020"-

Major observations:

At the outset it is worthwhile to note that the statistical (correlation) analysis conducted incorporating the monthly averages of weather data and monthly crime record data has a weak logic since the psychological aggression and igniting the criminal behavior can be best associated with the momentary extremes of thermal stresses. By taking monthly averages the effect of 'thermal extremes' can't be figured out thus resulting in poor R^2 values and the correlations coefficients*.*

Preferably the statistical correlation analysis should be done based on data corresponding to shorter intervals of time (may be weekly or daily), thus also increasing the number of observations, which is **presently only 156**, too less than required!!!

Please refer

- E. K. Erik Johansson , Sofia Thorsson , Rohinton Emmanuel, "Instruments and methods in outdoor thermal comfort studies - The need for standardization."] --- they have suggested an acceptable sample size ranging between 400-500.
- S. K. Thompson, "Sample size for estimating multinomial proportions," Am. Stat., vol. 41, no. 1, pp. 42–46, 1987. and
- Holmes, B. Illowsky, and S. Dean, "Calculating the Sample Size n: Continuous and Binary Random Variables."

Minor observations:

- *"An objective of this study is to …. deviations from thermal comfort."* **Replace "**deviations from thermal comfort" **with "thermal environment"** your study does not involve thermal comfort.
- **For computing crime per one lac Equation 1**, (I think**,** based on unitary law**) should be rewritten as** Crime per 100, 000 = Crime Count x 100,000/ (ERP) (Revised Equation 1)

Findings

Major observations:

- The **R squared value shows about 12.5%** of data fit the trendline**– for** OaP**,**
- **20.7 % for A_nFam, and**
- **22.3 % for Ars.   Apart from the poor correlation coefficents, the very poor R^2 values** (data fitting the trendline) **nullifies the validity of the findings.**
- The Conclusion section states that *"The findings do not support a significant positive correlation between green canopy*

cover with temperature, long-term crime, and population density." **This statement does not have required substantiation/ support in terms of statistical findings due to poor R^2 values.**

- **R^2 values may be enhanced by increasing number of samples etc. (refer the suggestion in 'Method Design' section)**

Analysis of Midland: Vegetation Cover, Population and Crime Statistics – what is the purpose of this para **dealing with dwellings demand** " Number of dwellings required is predicted to increase sharply over the same period to keep in step with population growth"

Midland crime statitics: *"Statistics shows ±20% or higher between summer months of December to February, in comparison with the preceding 9- month average"* **T**his is only indicative and **does not scientifically confirm** the effect of increasing heat stresses on crime rate as there might be **seasonal variations in other predictors responsible for crime,** e.g. social/ government practices, social gatherings, drinking, drug abuse, etc., as you have shown in your literature reviews.

It can be regressed, by including other factors also responsible for promoting criminal behaviour, to enable quantitative prediction of the crime rates with changes in heat stresses.

Validation of Findings/ Discussion

All the literature presented in this section refers to past studies and very little of this current study. Please make this section precise, may be maximum one to two paras including comparison of your findings with the past, thus showing how your findings add new knowledge to the existing domain/ corroborate or contradict the past findings.

Your statement: *Prima fasciae, the Midland case study does not suggest a positive correlation between temperature, crime statistics, green canopy cover (which rose over time) with population density. Thus, longitudinal studies might draw to different conclusions across the literature reviewed.* **---- Till now you don't have sufficient evidence through your research to say this.**

I repeat: R^2 values may be enhanced by increasing number of samples etc. (refer the suggestion in 'Method Design' section)

Conclusion

This section should contain condensed findings from the research and their possible implications on the study area, and if possible, on a larger domain/ region of the earth.

There are many paras not originating from this research: e.g. "The study emphasise that; the heat-sink properties … temperatures from surrounding local belts"**.**