

Interactive comment on “Factors of subjective heat stress of urban citizens in contexts of everyday life” by T. Kunz-Plapp et al.

Anonymous Referee #2

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1. Introduction (section 1) Heat Stress (HS) economic impacts - Heat stress and productivity at work: (Burke, Hsiang, und Miguel 2015): new empirical foundation for modelling economic loss in response to climate change. “Due to the urban heat island effect” (Oke, 1973) – strange reference here, put it at the end of the phrase. “Reducing impacts of heat stress thus is among the top issues of urban climate change adaptation strategies in Europe (EEA, 2012; Revi et al., 2014)”. – Thus, reducing... Highly dependent to world regions, specially when it comes to different reduction alternatives (see e.g. (Fernandez Milan und Creutzig 2015)).

2. Unclear structure of the review part (section 2).

Section 2.1 starts with a review on mortality, then it describes biometeorological studies

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and their methodology, and then in section 2.2. “the social science perspective”, it covers both morbidity and the so-called “subjective HS” and HS in general (including both impacts and adaptive behaviours). It is a bit unclear what is what.

Suggestion: Rename the whole section as “Literature review” and divide it into clearer fields of research, or if difficult, extrinsic and intrinsic factors affecting HS. Otherwise, according to what is reported (e.g. one on mortality, one on HS, one on subjective HS).

Mix of past/present when reviewing literature on HS - Why in past sentence when listing factors if location/ date is not given? I’d suggest “has been related to...”.

Characteristics of vulnerability to heat, including socioeconomic vulnerability, have been reviewed before. Typically, literature distinguish between extrinsic and intrinsic factors (see e.g. (Fernandez Milan und Creutzig 2015)). I suggest making this distinction in the section.

A recent review, (Gronlund 2014), focuses specifically on racial and SES vulnerability and lists other reviews that address this topic as well. The authors of this paper are missing some key papers in their review of heat-associated mortality, e.g., (Uejio u. a. 2011; Madrigano u. a. 2013; Smargiassi u. a. 2009; Zanobetti u. a. 2013; Fernandez Milan und Creutzig 2015), Additionally, the authors imply that their research focuses on HS, but their HS-factors literature review focuses only on mortality. They should also include in their review part susceptibility to heat-associated morbidity.

Better (and earlier) definition of “subjective heat stress”, as comparison to “individual heat stress”/ heat vulnerability? Why selecting that term? (Found only in line 26, and with no reference ““heat stress” here refers to the subjective and individual experiencing of heat as stress and is measured with the statements expressed by individual study participants.””). Unclear the distinction between heat morbidity, heat stress and subjective heat stress in the review paragraph (p 4624, line 25 – p.4625 line 17).

What is chronological age? “Studies on the vulnerability of elderly citizens to heat in

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the UK (Abrahamson et al., 2009; Wolf et al., 2010), the US (Sampson et al., 2013; Sheridan, 2007), and Australia (Hansen et al., 2011) suggested that elderly persons did not perceived themselves as vulnerable to heat just because of their chronological age.”

3 Methods

3.1 Fine methods, but a bit unclear the overall methodology (in terms of questions/ answers and what do they mean for the research question). Maybe a Figure/ Table on this? (e.g. table with “types of question”).

Make clearer to the reader how “subjective HS” is measured from the beginning. Concept of the study: shorter (this is not the interesting part for the reader, supposedly). Why not just a graph with peak T during the study period and showing the HW days?

“(.. .) subjective heat stress in everyday life experience was operationalized as subjective heat stress in general, at home, and at work as dependent variables and put in the context of subjective heat stress during twelve further typical daily activities”- ok but explain directly how you measure it.

“(.. .) To identify the main determinant of heat stress, a wide range of factors associated with heat stress reported in previous research was considered. They included health (subjective health status, health symptoms, and impairments from the heat), negative coping attitude (agreement to the statement that one is helplessly subjected to the heat), coping behaviour, elements of the urban built environment, and a number of social demographic characteristics”. Are these the dependent variables? Or how you measure subjective HS?

3.2 OK Why not summary table with main socioec. variables? Refer to Table 1 in the text.

4. Results

Brief intro to help the reader. Make it shorter, and more precise, by using the info in
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Tables.

English “In the context of the increased likelihood of longer, more frequent and more intense heat waves in Europe, which has been recently concluded by the IPCC again (IPCC, 2013), prevention of the health consequences of heat stress of urban citizens is an emerging environmental challenge (WHO and WMO, 2012).” – reformulate. “. . .dramatically show the magnitude of the impacts of such extreme events on human health”. “2.2 Factors of HS in (from) a social science perspective” “. . .) heat stress” here refers to the subjective and individual experiencing of heat as stress and is measured with the statements expressed by individual study participants”. Write clearer: this is your contribution you are trying to highlight “The outlined results from previous surveys on subjective heat stress suggest that lots of socio-demographic, health, and behavioural factors and many factors related to the built environment help to explain the observed differences. As these results have been obtained in bivariate analyses and comparisons, the previous studies, however, limit conclusions across the factors’ effects on subjective heat stress and conclusions on major or minor determinants for subjective heat stress. Additionally, it is not yet clear what proportion of observed variability in subjective heat stress they actually explain. Furthermore, as for some of the mentioned studies the data collection took place without preceding pronounced hot-weather periods, the actual weather conditions and the fact that respondents had to rely on their memories of heat experience might have influenced the responses (Abrahamson et al., 2009)”. Make use of abbreviations: e.g. Heat stress: HS.

References Burke, Marshall, Solomon M. Hsiang, und Edward Miguel. 2015. "Global Non-Linear Effect of Temperature on Economic Production". Nature advance online publication (Oktober). doi:10.1038/nature15725. Fernandez Milan, Blanca, und Felix Creutzig. 2015. "Reducing urban heat wave risk in the 21st century". Current Opinion in Environmental Sustainability, Open Issue, 14 (Juni): 221–31. doi:10.1016/j.cosust.2015.08.002. Gronlund, Carina J. 2014. "Racial and Socio-economic Disparities in Heat-Related Health Effects and Their Mechanisms: A Re-

view". *Current Epidemiology Reports* 1 (3): 165–73. doi:10.1007/s40471-014-0014-4. Madrigano, Jaime, Murray A. Mittleman, Andrea Baccarelli, Robert Goldberg, Steven Melly, Stephanie von Klot, and Joel Schwartz. 2013. "Temperature, Myocardial Infarction, and Mortality: Effect Modification by Individual and Area-Level Characteristics". *Epidemiology (Cambridge, Mass.)* 24 (3): 439–46. doi:10.1097/EDE.0b013e3182878397. Smargiassi, A., M. S. Goldberg, C. Plante, M. Fournier, Y. Baudouin, and T. Kosatsky. 2009. "Variation of Daily Warm Season Mortality as a Function of Micro-Urban Heat Islands". *Journal of Epidemiology and Community Health* 63 (8): 659–64. doi:10.1136/jech.2008.078147. Uejio, Christopher K., Olga V. Wilhelmi, Jay S. Golden, David M. Mills, Sam P. Gulino, and Jason P. Samenow. 2011. "Intra-urban societal vulnerability to extreme heat: The role of heat exposure and the built environment, socioeconomics, and neighborhood stability". *Health & Place, Geographies of Care*, 17 (2): 498–507. doi:10.1016/j.healthplace.2010.12.005. Zanobetti, Antonella, Marie S. O'Neill, Carina J. Gronlund, and Joel D. Schwartz. 2013. "Susceptibility to Mortality in Weather Extremes: Effect Modification by Personal and Small-Area Characteristics". *Epidemiology* 24 (6): 809–19. doi:10.1097/01.ede.0000434432.06765.91.

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Specific 1. Is the amount and quality of supplementary material (if any) appropriate? Yes 2. Does the paper address relevant scientific and/or technical questions within the scope of NHESS? Yes 3. Does the paper present new data and/or novel concepts, ideas, tools, methods or results? Yes 4. Are these up to international standards? Yes 5. Are the scientific methods and assumptions valid and outlined clearly? In theory yes, but could be clear to the reader with a re-writing exercise. 6. Are the results sufficient to support the interpretations and the conclusions? Yes. Also authors address the limitations openly in the discussion part. 7. Does the author reach substantial conclusions? Yes, however these should be written in a more focused way, avoiding repeating the results part. Suggestion: think what has to be said to a policymaker,

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and why is YOUR study relevant, compared to others. 8. Is the description of the data used, the methods used, the experiments and calculations made, and the results obtained sufficiently complete and accurate to allow their reproduction by fellow scientists (traceability of results)? Yes, however, it is unclear how the survey a) was structured b) designed, and c) looked like (number of questions?) 9. Does the title clearly and unambiguously reflect the contents of the paper? Yes, but I'd suggest a shorter and more concise title e.g. "Urban subjective heat stress throughout the day" 10. Does the abstract provide a concise, complete and unambiguous summary of the work done and the results obtained? Yes. 11. Are the title and the abstract pertinent, and easy to understand to a wide and diversified audience? See answer 9. I would include a brief clarification of what subjective HS is, to capture attention of readers (that's what's new, isn't it?) 12. Are mathematical formulae, symbols, abbreviations and units correctly defined and used? If the formulae, symbols or abbreviations are numerous, are there tables or appendixes listing them? 13. Is the size, quality and readability of each figure adequate to the type and quantity of data presented? I would add a figure with "agglomerated data" (e.g. coping measures: yes /no/ would have liked to, instead of all the measures). Don't understand why some coloured, some not. Figure 4 has no title (although it does have caption). 14. Does the author give proper credit to previous and/or related work, and does he/she indicate clearly his/her own contribution? Yes, but the distinction between subjective HS and heat vulnerability (although clear after reading the whole article) should be explicitly addressed before. 15. Are the number and quality of the references appropriate? Yes, some additional given already. Only a bit unclear the distinction between fields reviewed. 16. Are the references accessible by fellow scientists? 17. Is the overall presentation well structured, clear and easy to understand by a wide and general audience? 18. Is the length of the paper adequate, too long or too short? I suggest to make it shorter, specially sections indicated above. 19. Is there any part of the paper (title, abstract, main text, formulae, symbols, figures and their captions, tables, list of references, appendixes) that needs to be clarified, reduced, added, combined, or eliminated? See detailed comments. 20. Is the technical

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language precise and understandable by fellow scientists? yes 21. Is the English language of good quality, fluent, simple and easy to read and understand by a wide and diversified audience? Refine some parts. Shorter phrases.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 4619, 2015.

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