Citizen's mental models of extreme heat weather events: the role of affective framing effects

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Abstract

Due to climate change we are witnessing profound and dramatic environmental changes worldwide that bring new challenges to citizens, health authorities and policy makers. Among those changes is the increase in frequency, intensity, and duration of **Extreme Heat Weather Events (EHWEs)**. Better understanding of citizens' adaptation strategies to EHWEs is needed. With that in mind we performed an exploratory mixed methods study with the goal of identifying citizens' mental models of EHWEs and explore their appraisals of Norm Deviation, Demands, and Resources regarding those events. Because there is evidence that EHWEs can be evocative of positive affect, affective differences were also considered. Results are presented and its implications to the promotion of citizen's resilience and adaptive potential to EHWEs discussed.

Objectives

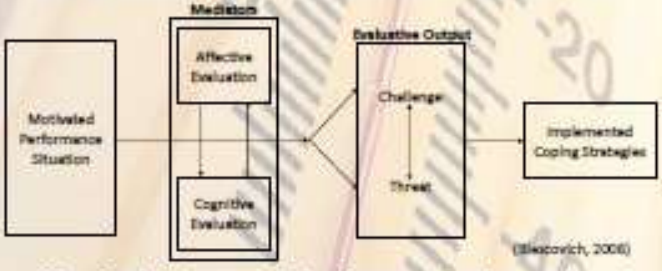
Identify **Extreme Heat Weather Events (EHWEs)** related:

- Situations (how are EHWEs situations perceived);
- Norm Deviation (how and how much EHWEs deviates from normal everyday);
- Demands (what are the demands posed by EHWEs and how are they appraised);
- Resources (what are the personal and social resources available to deal with EHWEs and how are they appraised);

Conceptual Approach

Biopsychosocial Model of Challenge and Threat (BPS Model; e.g. Blascovich, 2008)

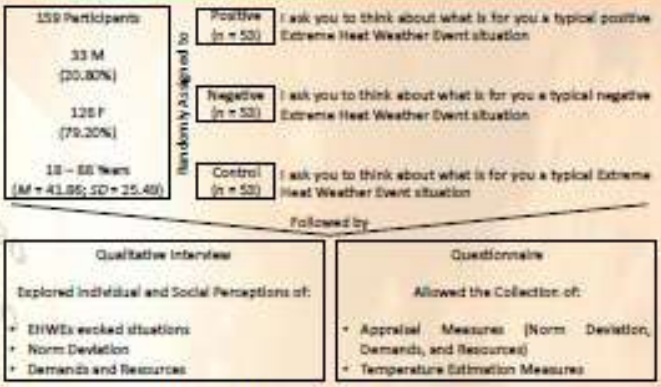
- Process View – how a situation that interferes with individual goals and needs is appraised;
- Integrates biological, psychological, and social processes, while also considering the synergy between cognitive and affective variables;



(Blascovich, 2008)

- When faced with a motivated performance situation people tend to appraise the demands posed by that situation and the available resources to deal with those demands;
- This appraisal process is mediated by an interaction between an affective and cognitive evaluation;
- On the one hand, when resources are appraised as sufficient or exceeding demands Challenge Appraisal (R≥D) occurs. On the other hand, when resources are appraised as insufficient Threat Appraisal (R<D) occurs;
- Challenge and Threat appraisals determine implemented coping strategies;

Methodology



Results (Quantitative & Qualitative)

Positive ≠ Negative and Control in: Temperature Estimation, Norm Deviation, Demands, and Resources;

Negative = Control in: Temperature Estimation, Norm Deviation, Demands, and Resources;

- To ease result presentation the table below will resume quantitative and qualitative differences between Positive and Negative conditions;

		Positive Condition	Negative Condition
EHWEs Situations		Situations of exposure to extreme heat that involve pleasant outdoor activities (e.g. go to a beach or pool, walk in the countryside, engage in outdoor social activities)	Situations of avoidance and discomfort associated with exposure to extreme heat (e.g. stay at home with windows and shutters closed, stay isolated from others, avoid social contact)
Temperature Estimation[*1]		*M* = 35.18 ºC; *SD* = 4.87 ↓	*M* = 38.38 ºC; *SD* = 4.70 ↑
Norm Deviation	**Quantitative**[*2]	*M* = 40.48; *SD* = 26.80 ↓	*M* = 60.77; *SD* = 25.78 ↑
	Qualitative	Situations are different from normal because they allow for activities that they cannot do on other days (e.g. go to a beach, walk in the countryside)	Situations are different from normal because they interfere negatively with their life (e.g. impossibility to do everyday tasks due to extreme heat weather)
Demands	**Quantitative**[*3]	*M* = 57.34; *SD* = 15.89 ↓	*M* = 70.87; *SD* = 18.55 ↑
	Qualitative	Psychological Demands (e.g. concentration difficulties, loss of patience, irritability, bad mood) Concerns (e.g. concerns about drinking more water, concerns about clothing, concerns about the need to wear sunscreen)	Physical Demands (e.g. breathing difficulty, indisposition, tiredness, dizziness, impossibility to perform tasks, sweating)
Resources	**Quantitative**[*4]	*M* = 68.63; *SD* = 14.58 ↑	*M* = 55.35; *SD* = 21.87 ↓
	Qualitative	Resources that can be accessed outdoors (e.g. drinking water, going for a swim, use a hat or an umbrella, search for a shade, apply sunscreen)	Resources associated with housing conditions (e.g. using fans or air conditioning, remain in colder areas of the household, take a bath, planning)

Notes: [*1] $t(1, 156) = 7.186$; $p < 0.001$; $\eta^2_p = 0.266$; $\alpha = 0.838$; [*2] $t(1, 156) = 11.700$; $p < 0.001$; $\eta^2_p = 0.191$; $\alpha = 0.946$; [*3] $t(1, 156) = 10.417$; $p < 0.001$; $\eta^2_p = 0.128$; $\alpha = 0.990$; [*4] $t(1, 156) = 6.779$; $p < 0.001$; $\eta^2_p = 0.101$; $\alpha = 0.898$; All measures collected with 1-100 mm Visual Analog Scales;

Conclusion

- Thinking negatively about EHWEs seems to be the default;
- Thinking positively about EHWEs can change that default and produce quantitative and qualitative differences in EHWEs appraisals, linking to behavioral differences;
- Comprehensive mental models about EHWEs should also acknowledge and encompass those differences, as they can help explain behavior in different situations;
- When addressing the public regarding EHWEs protective behaviors care should be taken to avoid possible effects of affective framing;

References

Blascovich, J. (2008). Challenge, threat, and health. In J. Y. Shah & W. L. Gardener (Eds.), *Handbook of Motivation Science* (pp. 481-493). New York, USA: Guilford Press. ISBN:9781593855680

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