

Under Pressure: The Impact of Psychological Stress on Usability in Cartographic Interaction

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Abstract:

From consulting a map to escape a natural disaster to trying to find your dentist's office to make an appointment time, there are numerous instances where a user may consult a map while under stress. Yet, this idea has not been explored in a controlled setting to understand *how* exactly stress manifests in a user during a cartographic interaction. This is the driving force for this study based on the research question of, "What is the role of psychological stress in cartographic interaction?"

To examine this, I first induce participant stress through a modified Trier Social Stress Test, a stress induction method used in the psychology field, which elicits an appropriate cortisol response using social-evaluative and cognitive stress. Then, participants receive maps with varying visual complexity and must complete a series of tasks. How the participants complete those tasks are observed and evaluated to determine the role of stress in the interaction.

The intention of this user study is to parallel the real-world phenomenon of a user experiencing psychological stress, requiring the use of a map to complete a task, and entering the cartographic interaction in that stressed state. Even if the map design isn't particularly stress-inducing, the effects of the user's stressed state may manifest through their decisions, actions, and behaviours.

One way I evaluate stress impacts is through observing quantitative measures reflecting user performance, supported by literature stating these variables are impacted by stress during user interaction. This includes outcomes such as task completion, speed and efficiency for a participant to complete a task, and accuracy of solution. I also inquire more qualitative measures to gauge user experience, focused on the pragmatics and perceived usability of the interaction.

The dimension of visual complexity is included in this study because of its direct influence on user stress. Levels of visual complexity are applied to the stressed and control groups of the study participants to be able to isolate the effects of the variables. While examining the effects of psychological stress, the study also reveals the role of the cartographic design in these interactions as well.

Knowing how stressed users behave while using maps can allow cartographers to design to mediate that stress effectively and intentionally. This also contributes to how user studies are conducted, incorporating both varied states of the design *and* varied states of the user. Rather than assuming a generalized user, this study explores the user as a variable entity in and of itself.

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