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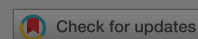
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Original Articles

From Warning to Wallpaper: Why the Brain Habituates to Security Warnings and What Can Be Done About It

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Abstract

Warning messages are fundamental to users' security interactions. Unfortunately, they are largely ineffective, as shown by prior research. A key contributor to this failure is habituation: decreased response to a repeated warning. Previous research has only inferred the occurrence of habituation to warnings, or measured it indirectly, such as through the proxy of a related behavior. Therefore, there is a gap in our understanding of how habituation to security warnings develops in the brain. Without direct measures of habituation, we cannot understand the mechanisms that underlie this phenomenon. In this study, we conducted an experiment to measure habituation to security warnings in a realistic setting. Using mouse cursor tracking as a surrogate for attention to

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unobtrusively measure habituation on participants' personal computers, we found that polymorphic warnings reduced habituation compared to conventional warnings. Together, our findings reveal the substantial influence of neurobiology on users' habituation to security warnings and security behavior in general, and we offer our polymorphic warning design as an effective solution to practice

Key words and phrases: behavioral information systems security cybersecurity fMRI functional magnetic resonance imaging habituation mouse cursor tracking neurobiology NeuroIS polymorphic warnings security warnings

Supplemental File

Supplemental data for this article can be accessed on the publisher's website at <http://dx.doi.org/10.1080/07421222.2016.1243947>

Notes

1. See <http://neurosynth.org/analyses/terms/visual>; https://wikipedia.org/wiki/Visual_cortex.
2. <http://neurosynth.org/analyses/terms/default>; https://wikipedia.org/wiki/Default_mode_network.
3. hMT+ or human middle temporal complex; <http://neurosynth.org/analyses/terms/motion>; https://en.wikipedia.org/wiki/Visual_modularity.

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