SaTC: CORE: Small: Tracking User Behavior, Cognitive Burdens, and the Impact of Behavioral Nudging on Security Updates by Young and Older Adults

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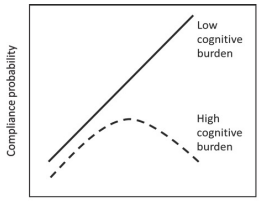
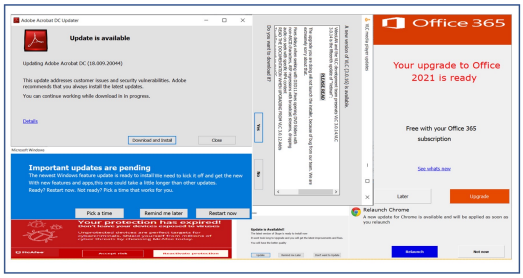
Demographics	Personal	Platform	Logistics
Age/Gender	Perceived Difficulty	Browsers	Memory/ storage
Level of Education	Input from Others	Smartphones	Time
Technological Literacy	Past Experience	Windows	UI
Type of Engagement (Work/Leisure)	Emotions (Worry, Insult, Annoyance)		

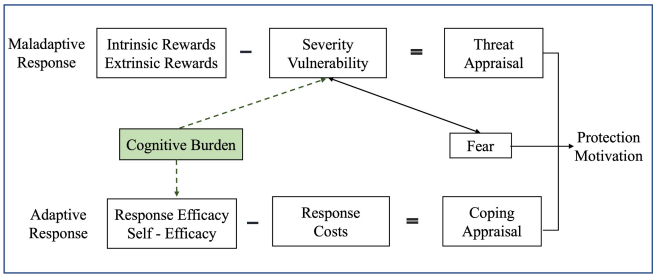
Some Factors associated with Update noncompliance



Hypothesized Interaction between cognitive burden and self-efficacy in update compliance



Testing messaging strategies



Testing Protection Motivation Theory

Key Problems Addressed and their Significance

- We address the lack of security update compliance through *understanding how older and younger adults make security decisions*
- We identify key factors that affect security-related software update behaviors as it relates to these two populations and *measure the moderator effect of cognitive burden on security update behavior.*

Scientific Impact

- The project contributes to both cognitive science and computer science by linking security-related user behaviors to broader theories of decision making and cognitive aging.
- We assess the effectiveness of cybersecurity countermeasures that rely on software updates.

Technical Approach

- We conduct simulation studies, surveys and behavioral experiments that test the *Protection Motivation Theory* across age groups, cognitive load conditions, and linguistic framing conditions
- We manipulate extraneous cognitive load and test how the cognitive load is handled by young and older adults
- We explore the behavioral nudge to target or manipulate some of these key factors

Contributions

- Our research contributes to the understanding of how security-related decisions are made in real-world settings
- We investigate the cognitive burden plays as a moderator variable in compliance behaviors
- We contribute to the investigation of whether small changes in messaging strategies are likely to nudge users toward better compliance

Broader Impact

- This research informs cybersecurity experts in PC environments.
- This project increases the knowledge base concerning software interface design for PC users including older adults and non-expert users.

Broader Impact (Education/Outreach)

The project involves diverse student populations and participants, particularly including Latinx, African-Americans, and women and builds capacity and collaboration in the area of cybersecurity research at collaborating institutions.

Broader Impact and Broader Participation

The results of the project aid in promoting *positive* cybersecurity behaviors, especially among the growing population of older adults.