

Please Continue to Hold:

An Empirical Study on User Tolerance of Security Delays

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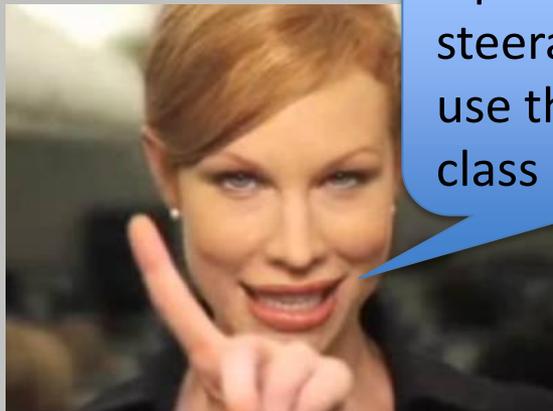
Motivations

- Security mitigations usually entail time costs
 - Designers usually try to hide these from users
 - Is this really the best way?
- Behavioral economics literature tells us people put up with delays when they are explained

E. Langer, A. Blank, and B. Chanowitz. *The Mindlessness of Ostensibly Thoughtful Action: The Role of “Placebic” Information in Interpersonal Interaction*. *Journal of Personality and Social Psychology*, 36(6):635–642, 1978.

Security Explanations

- Are security explanations any different?
 - Does it matter how plausible the security explanation is?
 - “For your security...”



...passengers in steerage cannot use the first class lavatory.

...outside food or drink is forbidden.





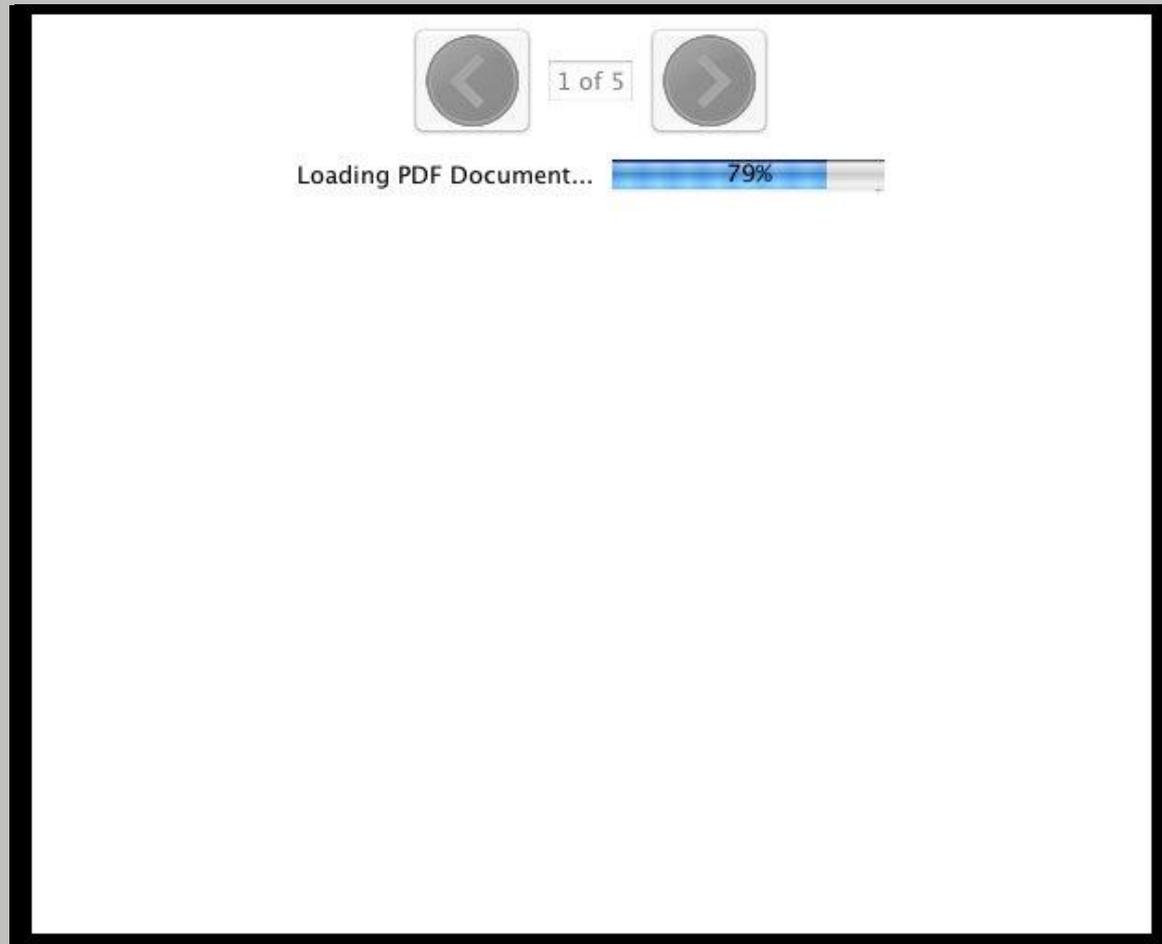
- Marketplace for crowd-sourcing
 - Great resource for human subjects experiments
 - The challenge is creating a study doable online
- Users have the purest of motivations...
 - ...cold hard ~~cash~~ change
 - Incentive to cheat when possible
- What does cheating tell us?
 - Are people less likely to cheat when given a “security” explanation?

Methodology

- Create a Turk task that features a delay
- Hypothesis:
People will cheat significantly less when they believe a delay is for security purposes
- If task is clearly for research, people may be less likely to cheat
 - Task needs to look like other non-research tasks
 - E.g., transcribing documents, image tagging, etc.



Introducing *SuperViewer*



Study Conditions

- Before viewing each page, a progress bar forces users to wait approx. 10s
 - We examined whether the explanation for this progress bar had an impact on rates of cheating
- **Control:** No progress bar
- **Loading:** Bar labeled “Loading”
- **Security:** Bar labeled “Performing security scan”
- **SecPrimed:** Same as above, but with an intro page warning about new security features and the danger of embedded PDF viruses

Turk Task

Use A New Online Document Reader

Once you accept this HIT, the SuperViewer PDF viewer will appear on the right. The viewer will contain a very short document. Please read the document to answer the following question. This task should only take a minute or two.

- You must answer the question to receive credit.
- This is a one-time task; we may ask you to participate in a follow-up survey for an additional bonus.

No personal information will be collected and your participation is strictly voluntary.

How many times does the word "said" appear?

Submit

SuperViewer

Introducing new security features!

- PDF documents can contain viruses or other malicious programs that can harm your files or steal your information.
- **SuperViewer protects your computer by performing a security scan before displaying documents.**
- **Malicious programs are detected and removed before they have a chance to harm your computer.**

Start SuperViewer

SuperViewer

Introducing a new PDF viewer!

- Thank you for choosing to test the SuperViewer PDF viewer, your completion of this task will help us make improvements.
- **SuperViewer works within your browser so you can view documents without opening another application.**
- **SuperViewer allows you to view PDF documents alongside other web content.**

Start SuperViewer

SuperViewer

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- PDF documents can contain viruses or other malicious programs that can harm your files or steal your information.
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Start SuperViewer



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Stately, plump Buck Mulligan came from the stairhead, bearing a bowl of lather on which a mirror and a razor lay crossed. A yellow dressinggown, ungirdled, was sustained gently behind him on the mild morning air. He held the bowl aloft and intoned:

--Introibo ad altare Dei.

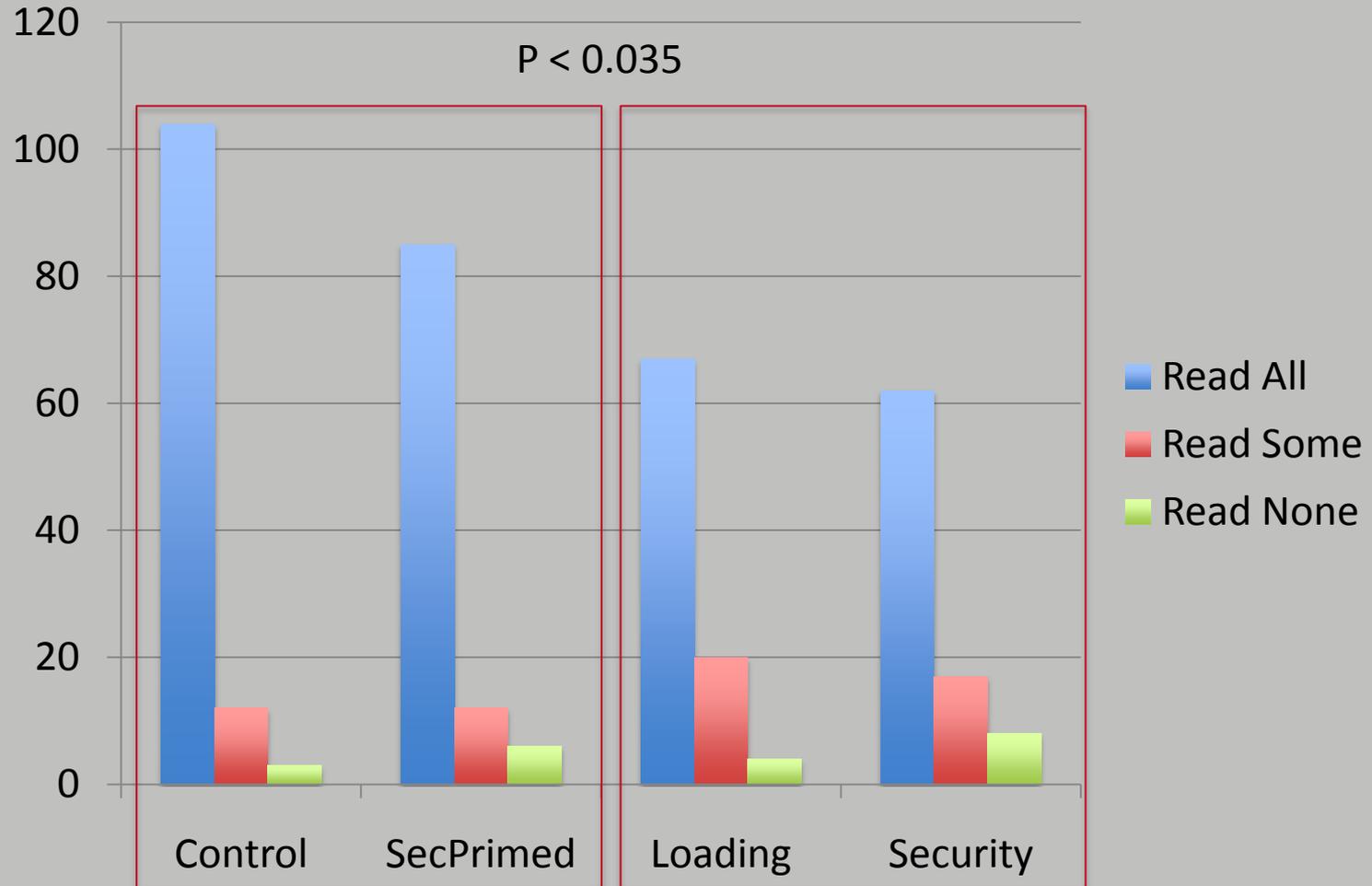
Halted, he peered down the dark winding stairs and called out coarsely:

--Come up, Kinch! Come up, you fearful jesuit!

Solemnly he came forward and mounted the round gunrest. He faced about and blessed gravely thrice the tower, the surrounding land and the awaking mountains. Then, catching sight of Stephen Dedalus, he bent towards him and made rapid crosses in the air, gurgling in his throat and shaking his head. Stephen Dedalus, displeased and sleepy, leaned his arms on the top of the staircase and looked coldly at the shaking gurgling face that blessed him, equine in its length, and at the light untousured hair, grained and hued like pale oak.

--Back to barracks! he said sternly.

Results



Open Questions

- What about a detailed non-security explanation?
 - **Loading** condition did not offer a concrete reason
- What is the role of security priming?
 - **SecPrimed** offered both the security priming and the security explanation for the delay
- What about a non-security prime with associated delay?
 - **SecPrimed** had a prime that supported the delay

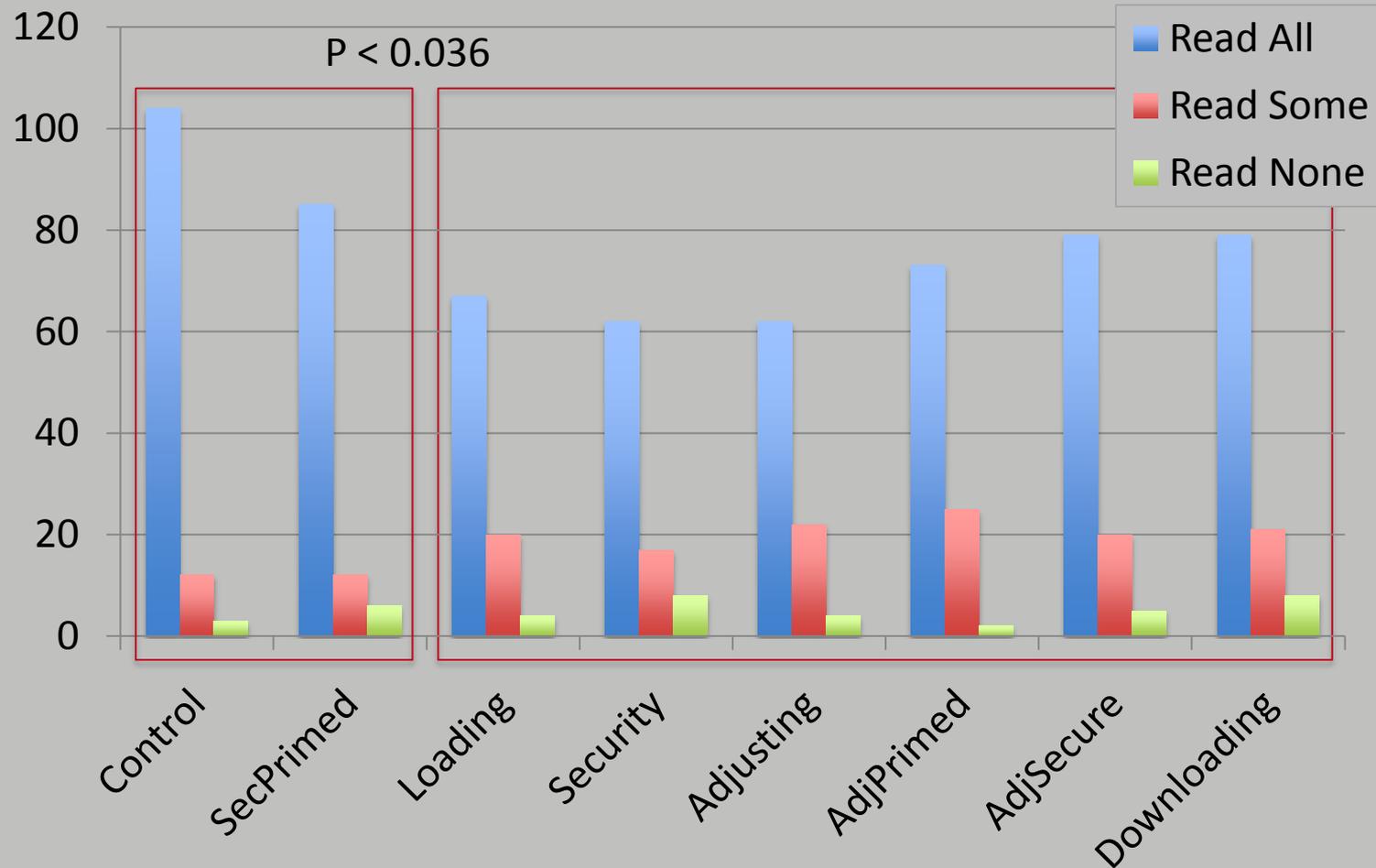


Additional Conditions

- **AdjPrimed:** Bar labeled “Adjusting document width” and an intro page supporting the delay
- **Adjusting:** Same as above, but no intro (i.e., priming)
- **AdjSecure:** Same as **Adjusting**, but using the intro from the **SecPrimed** condition
- **Downloading:** Bar labeled “Downloading document”
- After additional condition, $N = 800$



Updated Results



Additional Data

- No differences in accuracy between conditions
 - Differences between cheaters and non-cheaters ($p < 0.0005$)
- No differences in read time between conditions
 - Cheaters spent significantly less time ($p < 0.0005$)
- **Control** subjects significantly more likely to revisit pages of the document ($p < 0.007$)



Exit Survey

- Offered participants \$0.50 to take exit survey
 - Received 410 valid responses
 - 82 corresponded to cheaters (20%)
- Participants noticed delays:
 - 34% explicitly mentioned the page load time
 - Significantly fewer in **Control** ($p < 0.005$)
- Participants in both security primed conditions mentioned a known danger ($p < 0.006$)
 - So why did only one condition tolerate the delay?

Conclusions

- Security priming alone does not work
 - The cause of the delay must point to a threat
- Highlighting the delay alone does not work
 - The danger must be understood
- Participants were tolerant of the delay because they felt they were being protected from a known danger



Future Work*

- Measuring returned tasks
- Varying wait times
- Providing a “cancel” button
- Examining framing effects

*We totally plan to do some of this!



Fin

