

One Size Does Not Fit All: Demographic Differences in Spear Phishing Susceptibility

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Oliveira et al. 2017 at a glance

- CHI 2017
- Spear Phishing Susceptibility:
 - = $F(\text{Age, Principle of Influence, Life Domain})$
- Age:
 - Old vs Young
- Principles of Influence (Weapons):
 - Common human heuristics in decision making
- Life Domain:
 - Context of the weapon

Phishing



phish·ing

/'fɪʃɪŋ/ 

noun

the fraudulent practice of sending emails purporting to be from reputable companies in order to induce individuals to reveal personal information, such as passwords and credit card numbers.

- First step in advanced persistent threats
- Low cost, difficult attribution
 - SMTP Spoofing
- Successful attacks leverage psychological principles of influence to gain trust in target user

Phishing Interventions

- Technical Interventions
 - Real Time Warnings / Monitoring
 - Filtering
- User Training
- Anti Phishing technologies have been around for nearly two decades....

Exclusive: Facebook ... **phishing**

August 21, 2017

Amazon P
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Qatar
May 12 2017

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scam,

targeted
'rump's
ter of 2017



The group known as ...
wave of attacks trying to ...
of US government employees, ... and
think tank workers.

Principles of Influence

- *Influence: The Psychology of Persuasion* (Cialdini 1984)
- Key Principles of Influence:
 - Reciprocity
 - Commitment
 - Social Proof
 - Authority
 - Liking
 - Scarcity



Life Domains

- Financial
- Health
- Ideological
- Legal
- Security
- Social

Weapon and Life Domain

- “You can save 20 percent on your next electric bill by filling out our online survey within the next three days. Your participation will allow us to provide Regional Utilities with accurate information as to how they can improve their services. Take advantage of this limited time opportunity by clicking the link below: < link >”
- Weapon:
 - Scarcity (“within the next three days”)
- Domain:
 - Financial (electrical bill)

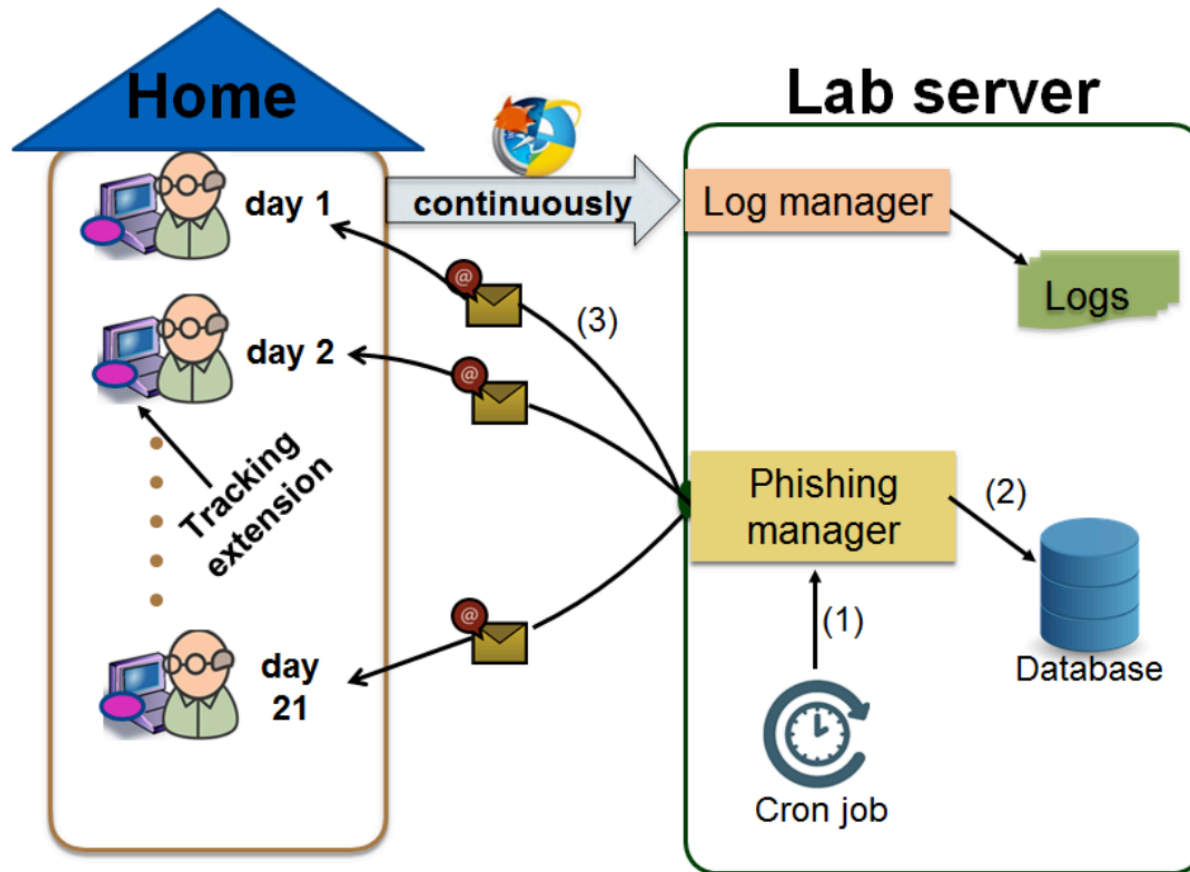
- “Our resources have indicated that you have a parking violation from 12/17/2015 at SW 89th Avenue at 3:34pm. Please go to our website to obtain more information about the violation and to pay your fine or refute your ticket: < link >, Sincerely, Parking Enforcement”

- | | | |
|-------------|----------------|----------------|
| • Domain: | • Life Domain: | • Weapon: |
| – Legal | – Financial | – Reciprocity |
| • Weapon: | – Health | – Commitment |
| – Authority | – Ideological | – Social Proof |
| | – Legal | – Authority |
| | – Security | – Liking |
| | – Social | – Scarcity |

Methods

- 21 day study examining internet use for one hour a day
- Participants (N=158)
 - 100 Younger (56% female)
 - 58 Older (43% female)
- Each day of study, subjects were sent one simulated spear phishing email counter balanced across weapon/domain
- Susceptibility self awareness LIKERT questionnaire

Study Framework

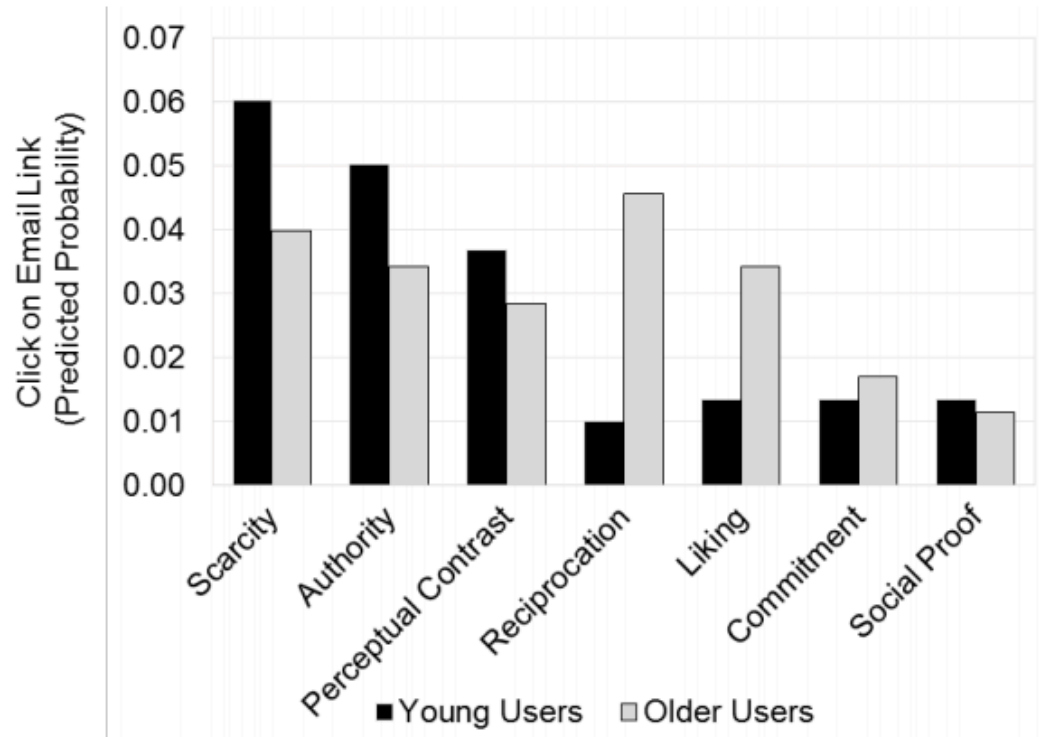


Results

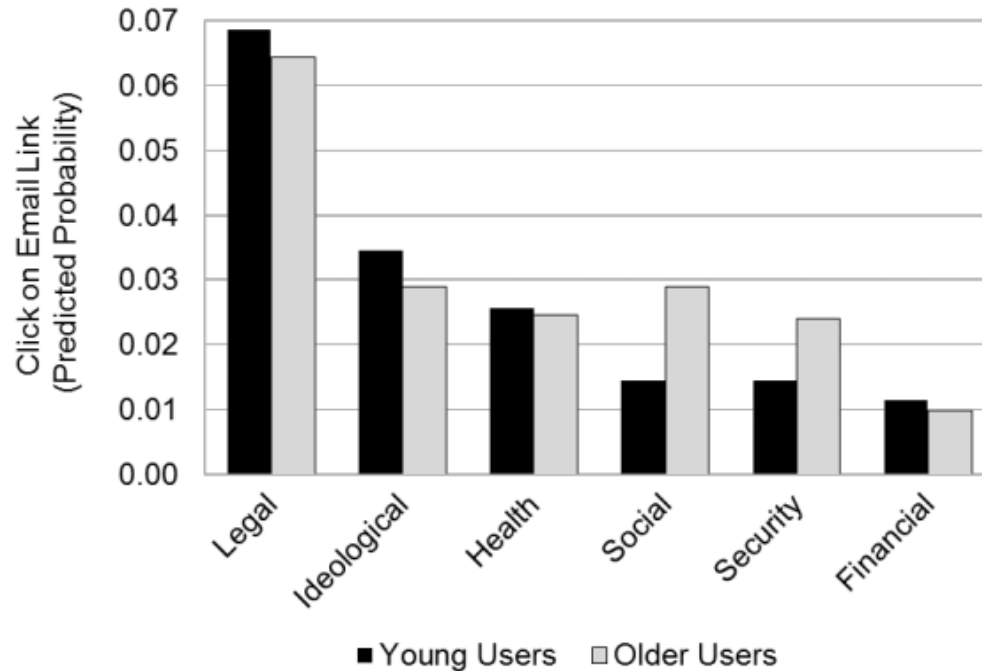
- 40% of participants clicked at least one link
- Older women most susceptible demographic
- Large discrepancy between actual behavioral susceptibility and self reported susceptibility, specifically amongst older users – people think they are better than they actually are (go figure)

Results – Weapon susceptibility

- Older Adults:
 - Reciprocity, Scarcity
- Younger:
 - Scarcity, Authority



Results – Life Domains



- Legal significantly more effective than all others
- Ideological significantly more effective than financial

Study Constraints

- Susceptibility awareness measured using LIKERT scale, analyzed using parametric measures = not ideal
- No temporal analysis to rule out learned effect
- How do we know for sure the users read the email before clicking the link?

Takeaways

- Demographic differences yield measurable differences in decision making heuristics across age, gender
- One size does not fit all:
 - Security interventions, communication, training needs to be tailored to specific demographics

Older Adults

- Lucrative and plentiful targets: fastest growing segment of the U.S> population
- Often have accumulated financial assets and/or hold powerful positions in finances and politics
- Cognitive processing capacity and sensitivity to deception decline with age
- Self reported trust increases

How can we do better?

- Avoiding usability studies solely on “WEIRD” subjects
 - **W**estern, **E**ducated, from **I**ndustrialized, **R**ich, **D**emocratic countries
- Be careful how you measure susceptibility



Questions?

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