28 - Mental models of security; Software updates

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Usable Privacy and Security

Carnegie Mellon University
CyLab

institute for SOFTWARE RESEARCH

Engineering & Public Policy

Today!

- Mental Models of Security
- Unpublished Study on Software Updating

Mental Models Study

Rick Wash, “Folk Models of Home Computer Security” (SOUPS 2010)

Wash 2010

- How uses *perceive* and *understand* computer security
- Understand the *mental models* of users

Wash 2010

- 33 semi-structured interviews
- About 45 minutes each
- Broad questions
- Hypothetical scenarios

Wash 2010

- Folk models used to decide whether to follow security advice
- For example, “Use anti-virus software” was viewed as *important* to users who saw viruses as supporting crime and *less important* to users who viewed viruses as buggy software

Wash 2010: Viruses

- “Virus” as general term for malware
- Generically bad
- Buggy software
- Virus as annoyance
- Support crime
- Multiple of the above

Wash 2010: Hackers

- “Hacker” term used for malicious actors
- Digital graffiti artists
- Burglars
- Criminals who target valuable targets
- Contractors who support criminals
- Multiple of the above

Wash 2010

- Main takeaway: How users perceive threats can affect their security-related behavior.
- Users often do not understand threats the same way that sophisticated users do.
- Users may take actions that only make sense if you understand their behavior.

Updating Behavior and Sentiment of Windows Home Users

Rich Shay
(study conducted for a class project and never published)

www.dilbert.com

What is Updating?

Patches are additional pieces of code developed to address problems (commonly called “bugs”) in software. Patches enable additional functionality or address security flaws within a program.

– NIST 2005

What is Updating?

A security update is a widely released fix for a product-specific, security-related vulnerability.

– Microsoft

Why do we care?

Successful attacks on unpatched software vulnerabilities have caused billions of dollars in damage.

– Robert Dacey, directory of GAO, 2003

Why do we care?

According to CERT/CC, about 95 per- cent of all network intrusions could be avoided by keeping systems up to date with appropriate patches; however, such patches are often not quickly or correctly applied.

– Robert Dacey, directory of GAO, 2003

Why do we care?

In spite of their high cost and the headaches they cause, many security breaches are easily avoidable. The security fixes are available, but users don't get them installed quickly enough (or at all)

– Microsoft 2008

Observation

- Timely updates important to security
- Most updating research focused on organizational setting
- Dearth of research on home-users

Study Goal

- Study behavior and sentiment of Windows home users on updates
- Offer insights to software-writers with large population of home users

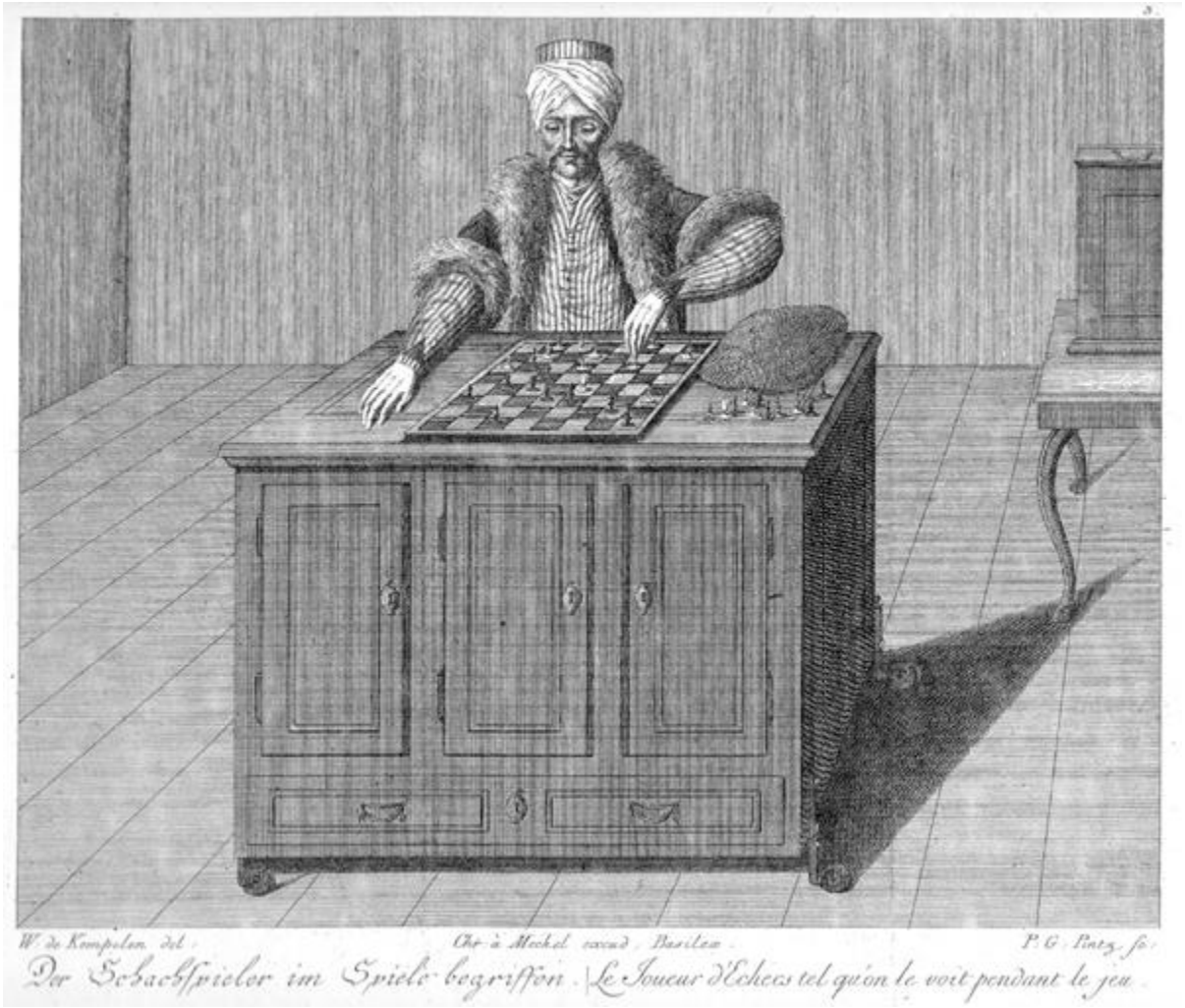
Windows Update

- Mechanism for Windows users to download updates
- Can be configured from control panel
- Recommendation: Automatic update and install

Methodology

Target Participants

Participate in a Carnegie Mellon University research study about computer updating. You must be at least 18 years old and own a personal computer you bought and maintain yourself. It must run a legal copy of Windows and not be primarily used for work.



Recruitment

Survey Administration

- Survey Gizmo
- Duplicates prevented
- 28 cents per participant

4. Using my computer is enjoyable. *

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
○	○	○	○	○

5. I regularly use a computer at work or at school. *

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
○	○	○	○	○

6. Using my computer is often difficult. *

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
○	○	○	○	○

Likert Questions

Survey Overview

Study Overview

- Demographics (eg, age, technical expertise)
- General computer usage
- Updating behavior
- Updating sentiment

Results and Findings

Removing Subjects from 647 to 542

Demographics

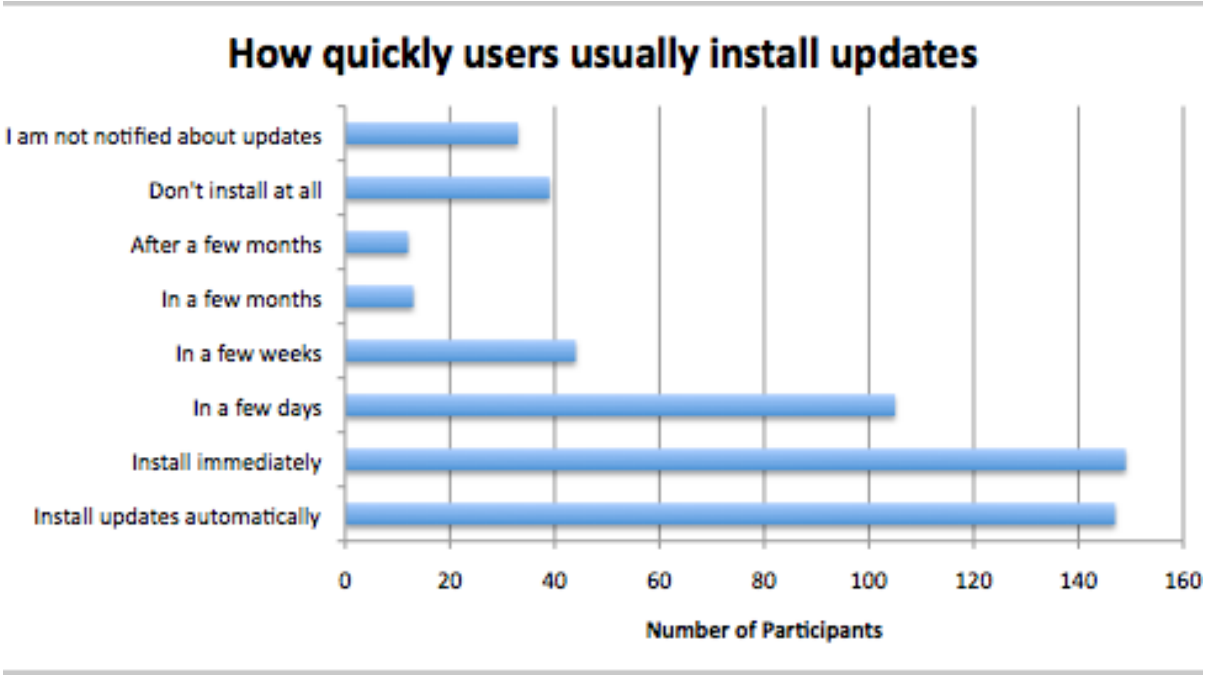
- 337 male, 205 female
- Mean age 31 years
- 230 from India, 191 from USA
- Most regularly use a computer at work/school

Computer Usage

- Mean time 31 hours
- Most popular OS: Windows XP, Windows 7
- Computer use enjoyable, not difficult
- Most victims of Malware

Updating Behavior

- 55% changed default settings
- 88% receive notification about updates
- Mean 7.11 updates in three months
  - Installed 4.24



Waiting to Install

What users liked

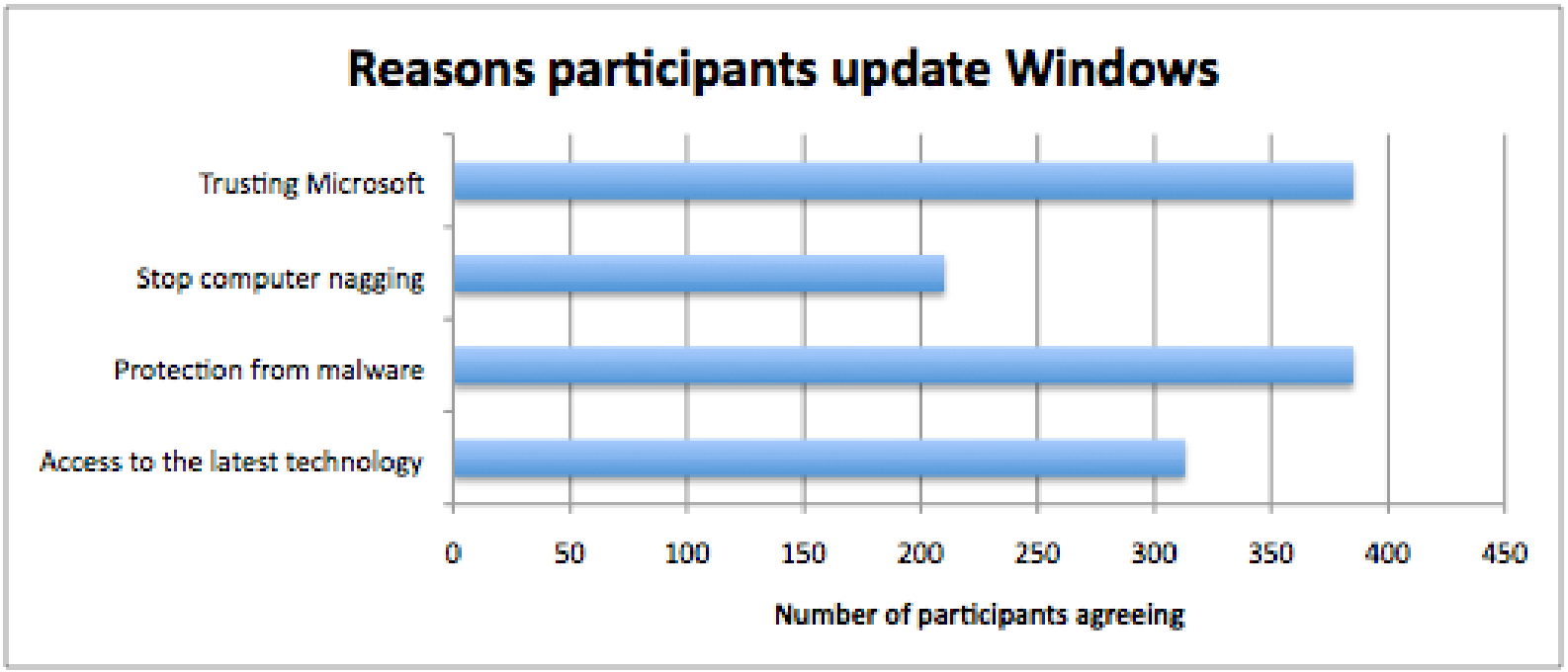
- 75% felt updates made them more secure
- 59% generally felt they knew what a given update would do

What users disliked

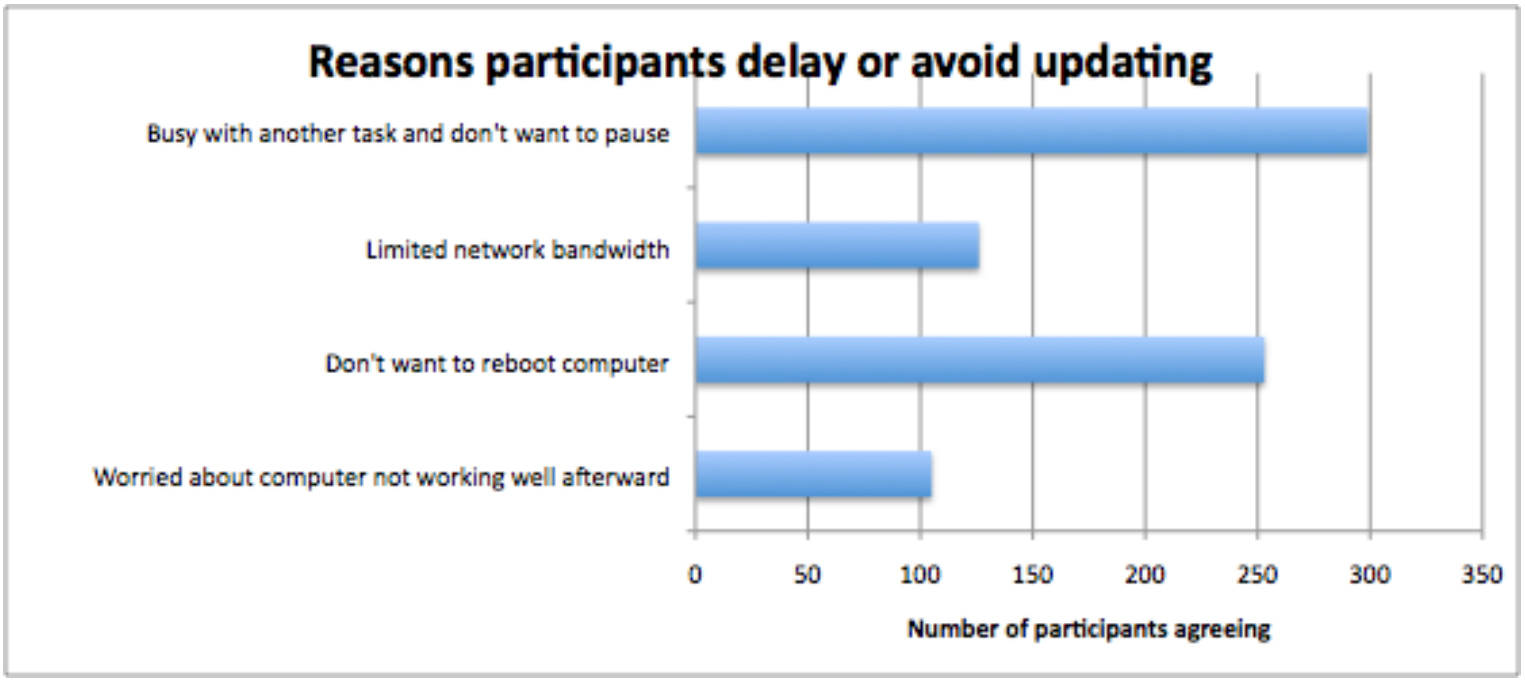
- 48% agreed to wanting computer to download and install updates automatically
- 65% found rebooting for updates annoying

Beyond Windows

- 61% agreed with more programs having automatic update feature
- 42% agreed with Microsoft handling all of their software updates (even from other companies)


Reasons participants update Windows
Trusting Microsoft
Stop computer nagging
Protection from malware
Access to the latest technology
0
50
100
150
200
250
300
350
400
450
Number of participants agreeing

Why Update



Delay/Avoid Updating

Technical Users

Technical particpants

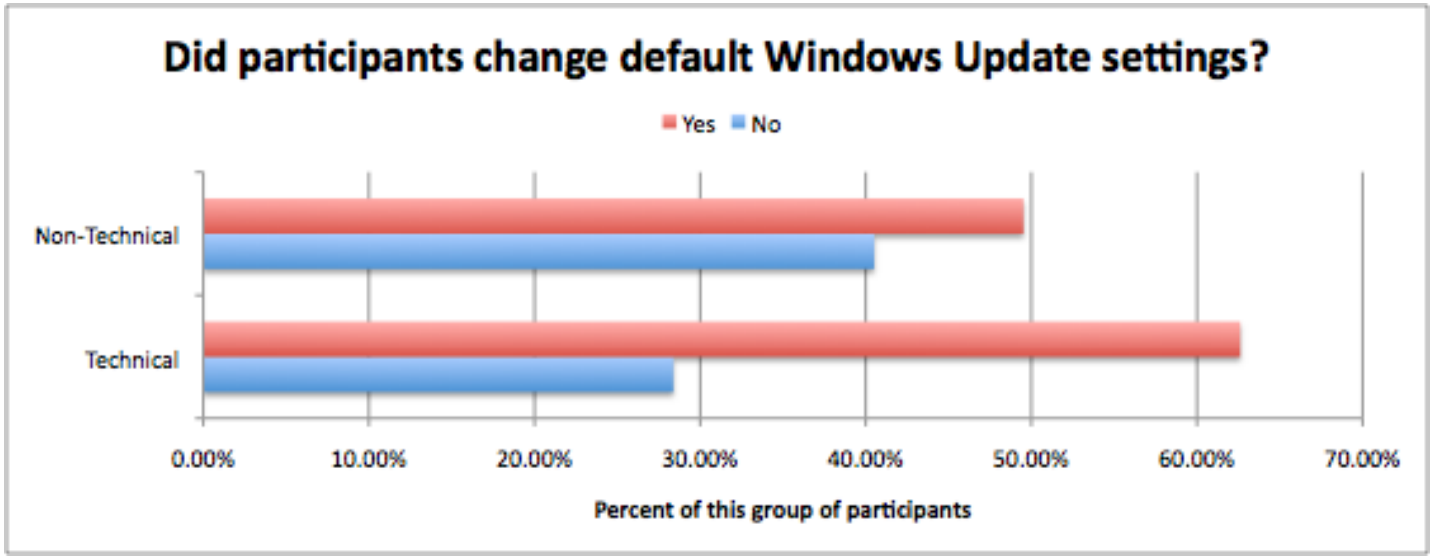
Are you majoring in or do you have a degree or job in computer science, computer engineering, information technology, or a related field?

Technical Participants

- More likely use computer at work/school
- Less likely to use Vista
- Install updates no more or less quickly

Technical Differences

- More concerned with malware
- Less annoyed by reboots
- More wish MS would handle all updates
- Less likely to avoid updates due to rebooting or being in middle of a task



Changing Defaults

Conclusion

In Conclusion

- Large study of Windows home users
- Examined behavior and sentiment
- Useful insights to software organizations

Main Findings

- Participants showed generally positive attitude toward updates
- Trusting Microsoft and fear of malware primary motivators to update
- Many participants wish other organizations offered automatic updates

but...

Main Findings

- Many participants changed default settings
- Many disabled automatic installation
- Participants indicated task interruption a main reason to avoid updates
- Participants found forced reboot annoying

Thank You.

Biases of typical UPS research

- Whom do we study in most of the papers you've read so far?
  - American / Western European
  - Middle/upper class
  - Well educated (or being educated)
  - English speaking
  - Technologically sophisticated


Point
cartes de recharge
orange™


I like
ГАЗ
Н.Д

Cross-cultural issues

- What is culture?
  - National origin?
  - Demographics?
- Why does culture matter in usable privacy & security research?
  - Social norms / user expectations
  - Legal requirements and expectations
  - The availability of systems/structures
  - Media portrayals

International studies

- Where is your sample coming from?
  - Comparable samples?
  - Recruitment?
- Identity of moderator?
  - Language? (Parallel translations)
  - Understanding cultural context?
- Ethics considerations