17 – Evaluating disclosures

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March 22, 2017
Today’s class

• Present Quantified Toilet privacy notices
• Evaluating notice and choice
Progress report presentations

Monday
• Opt-out
• Vitruvians
• Duo Facto

Wednesday
• Aactivists
• Password Protectors
• The Forgotten
Evaluating notice and choice
By what criteria should we measure effectiveness?

- Notice the notice?
- Stop and read?
- Understand?
- Useful information?
- Behavior change?
How can we conduct studies to measure notice effectiveness?

• Compare notice versions and no notice

• Ask comprehension and/or policy comparison questions

• Place notice in context of decision-making task

• Use deception so participants don’t realize study is about notices or privacy
What should we measure?

• How much time do they spend with notice?
  – More time could mean they find notice engaging, or hard to understand

• Time and accuracy to answer comprehension questions?

• Time and accuracy to compare policies?

• Do they report that this is information they want to know?

• Does information impact decisions or behavior?
Human-in-the-loop framework

Communication

Communication Impediments
- Environmental Stimuli
- Interference

Human Receiver

Personal Variables
- Demographics and Personal Characteristics
- Knowledge & Experience

Inten/ons
- Attitudes and Beliefs
- Motivation

Capabilities

Communication Delivery
- Attention Switch
- Attention Maintenance

Communication Processing
- Comprehension
- Knowledge Acquisition

Application
- Knowledge Retention
- Knowledge Transfer

Behavior
Privacy notice evaluation studies

- App notice timing
- Privacy “Nutrition Labels”
- AdChoices icon and taglines
- NTIA app transparency terms
- Privacy meters in search results
- App “Privacy Facts”
App notice timing

Does the timing of an app privacy notice impact the likelihood that people will notice, read, and remember it?
When are app privacy notices most effective?

• In the app store?
• After users download app?
• After users start using app?

Web survey and field experiment

• 277 survey participants
  – played virtual app online
  – asked to recall privacy notice minutes later

• 126 field experiment participants
  – downloaded and played app
  – asked to recall privacy notice the next day
App quiz on American inventors

Question 10 of 11

Madame C. J. Walker (1867-1919) was the first African-American female millionaire. Her business included products she invented such as:

- bifocals
- the parachute
- the lightening rod
- hair-growing lotion

Oops!! The correct answer is "hair-growing lotion"

NEXT
Notice based on NTIA prototype
Participants remembered notices shown during app use

- Notice shown in app store was not significantly different than no notice
- Notice shown in app use had better recall than shown in app store
- Need to place notices where they will be noticed and read
- User studies can inform design
Privacy
“Nutrition Labels”

What notice design is most effective?

Can people use privacy nutrition labels to find information and compare policies quickly and accurately?
Iterative design process

- Focus groups
- Lab studies
- Online studies

http://cups.cs.cmu.edu/privacyLabel

Long and short versions

<table>
<thead>
<tr>
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<th>information we collect</th>
<th>ways we use your information</th>
<th>information sharing</th>
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<tr>
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<td>marketing</td>
<td>telemarketing</td>
</tr>
<tr>
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<td></td>
<td>opt out</td>
<td>opt out</td>
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</tr>
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<td>your activity on this site</td>
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<tr>
<td>your location</td>
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Information not collected or used by this site: social security number & government ID, financial, health, location.

Access to your information
This site gives you access to your contact data and some of its other data identified with you.

How to resolve privacy-related disputes with this site
Please email our customer service department.

acme.com
5000 Forbes Avenue
Pittsburgh, PA 15213 United States
Phone: 800-555-5555
help@acme.com
Acme

Acme will collect your contact information. They will use this information for providing you service and maintaining the site and profiling. They will also use this information for marketing and telemarketing unless you opt out. They will share this information with other companies unless you opt out. They will share this information on public forums if you opt in.

Acme will collect your activity on this site, demographic information, your health information, and cookie information. They will use this information for providing you service and maintaining the site and profiling. They will also use this information for marketing and telemarketing unless you opt out. They will not share this information.

Acme will collect your preferences and your purchase information. They will use this information for providing you service and maintaining the site and profiling. They will also use this information for marketing and telemarketing unless you opt out. They will share this information on public forums if you opt in.

Information not collected or used by this site:
financial, SSN or government ID, and location.

Access to your information
This site gives you access to your contact data and some of its other data identified with you

How to resolve privacy-related disputes with this site
Please email our customer service department.acme.com
5000 Forbes Avenue
Pittsburgh, PA 15213 United States
Phone: 800-555-5555
help@acme.com
Online study

• 763 participants, recruited through Amazon’s Mechanical Turk

• Between subjects design
  – Standardized label
  – Standardized short label
  – Standardized short text
  – Full text
  – Layered text

• Measured time, accuracy, and enjoyability on information finding and comparison tasks
Effectiveness of AdChoices icon and taglines

Do people know what the icon/tagline mean?

Do people know what would happen if they clicked on the icon?
AdChoices icon study

- 1,505 participants
- Recruited through Amazon Mechanical Turk
- Between subjects online survey

Europe Faces New Hurdles in Crisis Over Debt
By STEVEN ERLANGER and RACHEL DONADIO 20 minutes ago
On the eve of a European Union summit meeting, crucial financial measures were still unresolved.
• Tempers flare as European Meeting Nears

I.B.M. Names Virginia Rometty as New Chief Executive
By STEVE LOHR 22 minutes ago
The selection of Ms. Rometty, a senior vice president at I.B.M., will make her one of the highest-profile women executives in corporate America.

Baseball’s Game of Telephone
By PAT BORZI 3 minutes ago
Monday night’s bullpen debacle by the Cardinals has put a new spotlight on baseball’s reliance on landlines.

New Poll Finds a Deep Distaste of Government
By JEFF ZELENY and MEGAN THEE-BRENNAN 3 minutes ago
With Election Day just over a year away, a deep
Varied icon and taglines

- Why did I get this ad?
- Interest based ads
- AdChoices
- Sponsor ads
- Learn about your ad choices
- Configure ad preferences
- ‘No tagline’
What people think happens if they click

AdChoices

56% More ads will pop up
45% Will take you to a page where you can buy advertisements on this website
27% Will take you to a page where you can opt out of tailored ads

% who agreed with each statement; some participants agreed with multiple statements
What people think happens if they click

Configure Ad Preferences

AdChoices

42%

56%

More ads will pop up

15%

45%

Will take you to a page where you can buy advertisements on this website

50%

27%

Will take you to a page where you can opt out of tailored ads

% who agreed with each statement; some participants agreed with multiple statements
Can people match terminology in guidelines to types of data and recipients described by apps?
NTIA Code of conduct for app transparency

• Developed through one-year multistakeholder process

• Goal: Short-form standarized privacy notice for apps

• Notice includes
  – 7 data types
  – 8 third-party entities

• User testing not part of the process
Data Types

• Biometrics

• Browser History and Phone or Text Log

• Contacts

• Financial Information

• Health, Medical or Therapy Information

• Location

• User Files
Data Types

- **Biometrics** (information about your body, including fingerprints, facial recognition, signatures and/or voice print.)
- **Browser History and Phone or Text Log** (A list of websites visited, or the calls or texts made or received.)
- **Contacts** (including list of contacts, social networking connections or their phone numbers, postal, email and text addresses.)
- **Financial Information** (Includes credit, bank and consumer-specific financial information such as transaction data.)
- **Health, Medical or Therapy Information** (including health claims and information used to measure health or wellness.)
- **Location** (precise past or current location and history of where a user has gone.)
- **User Files** (files stored on the device that contain your content, such as calendar, photos, text, or video.)
Data Types

• Biometrics (information about your body, including fingerprints, facial recognition, signatures and/or voice print.)

Is your inseam a biometric?
Carnegie Mellon study

• Quick study to inform NTIA MSHP
• 791 participants recruited online (cost $913.35)
• 4 experts from NTIA MSHP
• 10 app scenarios
• Users read each scenario and tried to determine which data types and entities were described
• 2 conditions – with and without parentheticals

Scenario example

The SuperTax app lets you fill out and submit your tax forms quickly and easily.

SuperTax will take a picture of your W-2. It will answer questions about your financial information, including salary and interest income.

It will then submit your return to state and federal agencies.

The scenarios describe the data collection and sharing completely, so you do not need to guess anything outside of what is described.

16. For each data collected by the app, what type of data is it?

<table>
<thead>
<tr>
<th></th>
<th>Biometrics</th>
<th>Browser History and Phone or Text Log</th>
<th>Contacts</th>
<th>Financial Information</th>
<th>Health, Medical or Therapy Information</th>
<th>Location</th>
<th>User Files</th>
<th>None of the Above</th>
<th>Not Sure</th>
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<tbody>
<tr>
<td>Photo of W-2</td>
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<td></td>
<td></td>
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<tr>
<td>Salary</td>
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<td>Interest Income</td>
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<td></td>
<td></td>
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</tbody>
</table>
Results

- All 4 experts agreed less than half the time
  - So unclear which answers are correct
- High agreement (>60% agreement) among online participants occurred less than half the time
- Parentheticals helped some, but some definitions were confusing
- Little evidence that these categories and definitions are well understood by users or experts
Effectiveness of privacy meters in search results

Do meters change purchase behavior?
Merrell Primo Chill Slide - Men's Tan: Merrell Shoes
Buy Merrell Primo Chill Slide - Men's Tan and find Spring trends at Onlineshoes. Free Shipping and Exchanges on all Merrell...
http://www.traffick.com/track.htm?pid=1031... - Privacy Policy - Similar Pages

Merrell Primo Chill Slide Shoes, Chocolate, Women's
Italian styled winter slide for convenience and warmth. Easy-on and water resistant, the Prime Chill gives your feet after-sport comfort in casual style. Water-resistant pigskin leather upper with sheepskin lining. Removable wool fleece footbed. Injection-molded nylon Shank for increased arch support. Air Cushion EVA midsole for softer flex and increased comfort. Merrell Pilot sole with sticky rubber sports a weight-saving design that is sized and barred for traction....
http://clickserve.cc-dt.com/link/ddiprod?id=41000... - Privacy Policy - Similar Pages

Merrell Primo Chill Slide
http://shopping.yahoo.com/p:Merrell%20Primo%20Chill... - Privacy Policy - Similar Pages

Merrell Primo Chill Slide (Men's)
We heated up our stylish Italian standout slide with a sheepskin lining with removable footbed and water resistant pigskin upper. Merrell Pilot Sole has a weight-saving cutaway configuration but is boldly sized and barred for wet and dry surface traction. FEATURES:
How do we test whether privacy meters change behavior?

Hypothetical task
- Search for product
- Which site would you buy from?

Real task
- Search for product
- Make purchase with your credit card

Hypothetical
No real privacy tradeoff

Expensive
Difficult to control
First purchasing study had significant limitations

- Participants were all students
- Reimbursement did not incentivize saving
- Price/privacy tradeoff not obvious
- Maybe people just like pretty indicators
- Privacy-sensitive item not sensitive enough
So we tried again

- 72 Pittsburgh residents
- Price/privacy tradeoff
- Fixed payment, keep the change
- New icons, new products, new conditions

Merchant selection

- Selected 10 merchants for each product
- No well-known merchants
- Controlled first four search results: more expensive → better privacy

<table>
<thead>
<tr>
<th>Merchant</th>
<th>Privacy score</th>
<th>Price w/ shipping</th>
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<tbody>
<tr>
<td>ccvsoftware.com</td>
<td>?</td>
<td>$14.45</td>
</tr>
<tr>
<td>discountofficeitems.zoovy.com</td>
<td>0/4</td>
<td>$14.60</td>
</tr>
<tr>
<td>instawares.com</td>
<td>2/4</td>
<td>$14.80</td>
</tr>
<tr>
<td>officequarters.com</td>
<td>4/4</td>
<td>$15.14</td>
</tr>
</tbody>
</table>
Privacy information condition

Duracell Alkaline Battery, AA, 8/PK
Duracell Coppertop Alkaline AA Batteries Long-life alkaline batteries provide the best, longest power source. Recommended for use in smoke alarms, flashlights, lanterns, calculators, pagers, cameras, recorders, radios, CD players
www.cppsoftware.com/c/product.htm

$14.45 (w/shipping)

Duracell AAB8 DURACELL - 8/PK
Duracell AAB DURACELL Alkaline Battery Value Packs DURACELL AA ALKALINE BATTERY - 8 PACK Cardboard card for peg hook 8 pack Specifications Weight 0.45 lbs Length 4.5 inches Width 3.75 inches Height 1 inches Manufactures Web site www.duracell... www.instawares.com/Coppertop-Alkaline-Lithium-Bat... Privacy Policy

$14.60 (w/shipping)

Duracell Alkaline Battery Value Packs
Duracell AAB DURACELL Alkaline Battery Value Packs DURACELL AA ALKALINE BATTERY - 8 PACK Cardboard card for peg hook 8 pack Specifications Weight 0.45 lbs Length 4.5 inches Width 3.75 inches Height 1 inches Manufactures Web site www.duracell... www.instawares.com/Coppertop-Alkaline-Lithium-Bat... Privacy Policy

$14.80 (w/shipping)

Duracell Coppertop Alkaline AA Batteries
Long-life alkaline batteries provide the best, longest power source. Recommended for use in smoke alarms, flashlights, lanterns, calculators, pagers, cameras, recorders, radios, CD players, medical equipment, toys and electronic games. Dependable after seven years of storage.
www.officequarters.com/product.php/item/DUR-MN1500B8... Privacy Policy

$15.14 (w/shipping)
<table>
<thead>
<tr>
<th>Product Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>Duracell AA Batteries</td>
<td>$14.45</td>
</tr>
<tr>
<td>Duracell AA8 DURACELL Battery Pack</td>
<td>$14.60</td>
</tr>
<tr>
<td>Duracell Alkaline Battery, AA, 8/PK</td>
<td>$14.80</td>
</tr>
<tr>
<td>Duracell Coppertop Alkaline AA Batteries</td>
<td>$15.14</td>
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Irrelevant information condition
No information condition
Privacy icons influenced purchases

• No privacy info: most people purchased where price was lowest

• With privacy info: more people purchased from expensive sites with better privacy

• No clear difference between products
  – Because we didn’t control privacy premium?
Follow-up study to control privacy premium

• Needed cooperation of vendors
• Contacted 46 battery and sex toy vendors
• Convinced 8 to adjust prices for our study
  – Asked one to lower prices and promised to pay the difference
  – Sent $140 check to The Dirty Bunny for “research project assistance”
Sure enough…

Privacy-sensitive nature of product impacts willingness to pay a premium for privacy

App “Privacy Facts”

Do people notice Privacy Facts in app store?
Do privacy facts influence choices about which apps to download?
Android Privacy Facts

- Task: select apps for friend with smartphone
  - Choose from 2 similar apps with different permission requests
- Participants who saw Privacy Facts more likely to select apps with fewer permissions
  - Brand and rating reduce effect

P.G. Kelley, L.F. Cranor, and N. Sadeh. Privacy as part of the app decision-making process. CHI 2013.
Important to test, even on low budget
Test comprehension in context
How would you evaluate your Quantified Toilet notice and choice designs?