Designing Privacy Tools for Web Browsing

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Usable Privacy and Security
Carnegie Mellon University
Johnny is very shy and withdrawn, invariably helpful but with little interest in people or in the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail.

Is Johnny more likely to be a librarian or a farmer?

Thinking, Fast and Slow. Daniel Kahneman, 2013
Agenda

- Hurdles In Privacy Decision Making
- Choice Architecture
- Assessment of Privacy Tools for Web Browsing: A Choice Architecture Focus
  - Advertising Industry Opt-Out Tools
  - Tracking Blockers Browser Plugins
  - Privacy Tools for Facebook
- Conclusion
Hurdles in (Privacy) Decision Making
Asymmetric and Incomplete Information

- Many unknowns and uncertainty for the user
  - How user information will be used?
  - Who is collecting user information?
  - What other information the website knows about the user?
  - With whom would user information be shared?
  - How does the website protect user information?
  - Can user control or limit how website uses his information?
Bounded Rationality

- Limited memory resources
- Limited cognition resources
- Limited attention
- Difficult to assess or foresee risks
- Difficult to assess all alternatives
Behavioral Biases

- Optimism and Overconfidence
  - Underestimate Privacy Risks
- Status Quo
  - Conform to the norms
  - Affinity to default choices
- Hyperbolic Time Discounting
  - Overestimate present benefits of disclosure
  - Underestimate future risks
- Loss Aversion
  - Losses are weighted more than gains
  - Endowment effect
Decision Making Heuristics

- Availability
- Representativeness
- Anchoring
Choice Architecture

*Nudge*

Improving Decisions About Health, Wealth, and Happiness

Richard H. Thaler and Cass R. Sunstein

Revised and Expanded Edition

"One of the few books I've read recently that fundamentally changes the way I think about the world." —Steven D. Levitt, coauthor of *Freakonomics*
Design Choices

- Information: Reduces information asymmetries and provides a realistic perspective of risks
  - Awareness
  - Education
  - Feedback

- Presentation: Provides contextual cues through the User Interface to reduce cognitive load and convey the risk properly
  - Framing
  - Ordering
  - Saliency
  - Structure
Design Choices

- **Defaults**: Reduce users’ effort by configuring the system according to what is most likely to conform to most users’ expectations.

- **Incentives**: Motivate users to behave according to their stated preferences.
  - Cost (e.g., make it harder to use a system or feature)
  - Rewards

- **Time**: Define the right moment to intervene.
Decision Making Heuristics

- Availability
- Representativeness
- Anchoring
Ad Industry Opt-Out Tools
LET'S TACKLE TO DO'S.

BLACK+DECKER Lawn Mowers 20 in. 13-Amp Corded Electric

$199

SHOP >

SHOP >
Welcome to the Digital Advertising Alliance’s consumer choice page. The companies participating in this page provide transparency and choice under the DAA Principles.

Some of the ads you receive on Web pages are customized based on predictions about your interests generated from your visits to different Web sites. This type of ad customization is sometimes called "online behavioral" or "interest-based" advertising. Such online advertising helps support the free content, products and services you get online. The DAA Principles apply to interest-based advertising and other applicable uses of Web viewing data collected from a particular computer or device over time and across unaffiliated Web sites.

Using the tools on this page, you can opt out from the collection of Web viewing data for interest-based advertising and other applicable uses, by some or all of the participating companies.

- See all the participating companies on this choice page and learn more about their practices;
- Also find out which participating companies have currently enabled customized ads for your browser;
- Check whether you’ve already opted out from participating companies;
- Exercise choice with some or all participating companies, using opt-out cookies to store your preferences in your browser; or
- Use the "Choose All Companies" feature to opt out from all currently participating companies in one step. Go

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### All Participating Companies (121)

These 3 participating companies have enabled interest-based ads for this web browser.

Click the company name to find out more about a participating company. To opt out from interest-based ads by one or more companies, check the box(es) in the "Select" column next to the company name(s), and then hit the "Submit your choices" button. You can also use click the "Select all shown" box to pre-check all the listed companies before you hit the "Submit" button.

Need help?
These 3 participating companies have enabled interest-based ads for this web browser.

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Need help?

<table>
<thead>
<tr>
<th>COMPANY NAME</th>
<th>SELECT ALL SHOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Advertising</td>
<td></td>
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<tr>
<td>Undertone</td>
<td></td>
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<tr>
<td>Yahoo</td>
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</tbody>
</table>

Submitting your choices for the selected companies stores your opt out preference(s) in your browser. [Learn More]
These 121 companies participate in the DAA's consumer choice page.

Click the company name to find out more about a participating company. To opt out from one or more companies, check the box(es) in the "Select" column next to the company name(s), and then hit the "Submit your choices" button. You can also click the "Select all shown" box to pre-check all the listed companies before you hit the "Submit" button. An [-] symbol in the check box indicates that you have already set an opt out for this company.

Need help?

<table>
<thead>
<tr>
<th>COMPANY NAME</th>
<th>SELECT ALL SHOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuen Inc.</td>
<td>status currently unavailable</td>
</tr>
<tr>
<td>eBay Enterprise (formerly FetchBack)</td>
<td>status currently unavailable</td>
</tr>
<tr>
<td>Videology</td>
<td>status currently unavailable</td>
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<tr>
<td>33Across</td>
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<td>Acxiom</td>
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<td>Adara Media, Inc.</td>
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<td>Adblade Premium Ad Network</td>
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<td>AddThis (including XGraph)</td>
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<tr>
<td>Adelphic</td>
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<td>Adobe Media Optimizer</td>
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</tbody>
</table>

Submitting your choices for the selected companies stores your opt out preference(s) in your browser. Learn More.
Tracking Blockers
Browser Plugins
Disconnect lets you visualize and block the invisible websites that track your browsing history. Click the interactive items below to find out more!

**Toolbar button**

The **toolbar button** shows you the total number of tracking requests on every page you go to. Click the button to see and block or unblock the requests.

**Dropdown**

- Advertising: 19 requests
- Analytics: 6 requests
- Social: 0 requests
- Content: 4 requests

**Navbar**

**Common tracking sites**

**Other tracking sites**

**Options**

**Dashboard**
Disconnect lets you visualize and block the invisible websites that track your browsing history. Click the interactive items below to find out more!

Toolbar button

Dropdown

The dropdown shows you the number of tracking requests by company. Green means the requests are blocked. Gray means they’re unblocked. Click any icon or checkbox to block or unblock requests.

Navbar

Common tracking sites

Other tracking sites

Options

Dashboard
Disconnect lets you visualize and block the invisible websites that track your browsing history. Click the interactive items below to find out more!

- Toolbar button
- Dropdown
- Navbar
- Common tracking sites
  - Common tracking sites – Facebook, Google, and Twitter – are shown separately to make them easy to block or unblock. Click any icon to block or unblock a site.
- Other tracking sites
- Options
- Dashboard
Using Cash and Charm, Putin Tries to Subvert E.U. Sanctions
Welcome to Ghostery for Firefox version 5.4.3!

Ghostery looks for third-party page elements (or "trackers") on the web pages you visit. These can be things like social network widgets, advertisements, invisible pixels used for tracking and analytics, and so on. Ghostery notifies you that these things are present, and which companies operate them. You can learn more about these companies, and if you wish, choose to block the trackers they operate.

This quick walkthrough will highlight some of Ghostery’s options and give you a chance to set things up straight-away. You can change any of these decisions (and view more options) by visiting the full Ghostery options page at any time. If you have any questions during the process, drop us a line at support@ghostery.com.
Help support Ghostery by sending anonymous statistical data back to Ghostery HQ.

When you enable Ghostrank, Ghostery collects anonymous data about the trackers you've encountered and the sites on which they were placed. This data is about tracking elements and the webpages on which they are found, not you or your browsing habits.

... See more.

- Click here to enable Ghostrank
Default Active Alert Bubble

When Ghostery detects trackers on a page you're visiting, it displays the companies that operate those elements in a purple box at the top right corner of the screen. If you'd rather Ghostery work in the background, you can uncheck the box below.

There are more ways to customize the purple box on Ghostery's options page.

Click here to enable Alert Bubble
Blocking Choices Shown Late and Off by Default

Ghostery can prevent the page elements it detects from running in your browser.

Blocking trackers will prevent them from running in your browser, which can help control how your behavioral data is tracked. Keep in mind that some trackers are potentially useful, such as social network feed widgets or browser-based games ... Blocking may have an unintended effect on the sites you visit.

Please let us know if you run into any issues.

Trackers that got blocked will be crossed out in the alert bubble and the findings panel.

**Trackers**

- **Advertising**: 978 trackers: blocking none
- **Analytics**: 317 trackers: blocking none
- **Beacons**: 380 trackers: blocking none
- **Privacy**: 19 trackers: blocking none
- **Widgets**: 200 trackers: blocking none

**Cookies**

- Show: all
- Search for: tracker name
Discouraging Blocking Tracking

Ghostery can prevent the page elements it detects from running in your browser. Blocking trackers will prevent them from running in your browser, which can help control how your behavioral data is tracked. Keep in mind that some trackers are potentially useful, such as social network feed widgets or browser-based games. Blocking may have an unintended affect on the sites you visit. Please let us know if you run into any issues.

Trackers that got blocked will be crossed out in the alert bubble and the findings panel.

**Trackers**

- **Advertising**: 426 cookies, blocking none
- **Analytics**: 132 cookies, blocking none
- **Beacons**: 154 cookies, blocking none
- **Widgets**: 30 cookies, blocking none

**Cookies**
Creating Awareness
Ineffective Visual Cues
Privacy Tools for Facebook
Privacy Checkup

Hi Charlie — Sorry to interrupt. You haven’t changed who can see your posts lately, so we just wanted to make sure you’re sharing this post with the right audience. (Your current setting is Public, though you can change this whenever you post.) Learn more.

Who do you want to share this post with?

- Friends
- Public
- More Options
Privacy Settings

Contact Info
Name
Everyone
Friends of Friends
Friends & Family
Profile Picture
Photos & Videos
Posts
Other Profile Info
Comments

Additional Settings you should be aware of:

- Facebook partners cannot use your public info
- Friends can share your info
- Advertisers cannot show your info to friends in ads

Questions? See our FAQ!
Passive aggressive people irritate the hell out of me, if you can't say something to my face maybe you should keep your mouth shut.

Facebook Nudges
That was almost the ‘Oh wow’ moment when I realized that more people could see my posts than I thought about.

So I bought a Rick Pitino Makers bottle for $50 and turned around and sold it for $180, lol...

These people and ANYONE ON THE INTERNET can see your post.

“That was almost the ‘Oh wow’ moment when I realized that more people could see my posts than I thought about”
“It helped me avoid getting into fights on Facebook because you have to stop and think.”

“I used it to correct grammatical errors or statuses that looked off.”

Congratulations to the great State of Mississippi for ratifying the 13th Amendment of the U.S. Constitution to ban slavery. Oh wait, wasn't that supposed to be done 148 years ago?
not excited about still being sick wtf

Your post will be published in 3 seconds.

Post Now  Edit  Cancel

not excited about still being sick after spending all afternoon in bed not doing my paper or having fun.

Your post will be published in 3 seconds.

Post Now  Edit  Cancel
Conclusions

• Behavioral biases affect privacy decision making
• Good tool design needs to take these biases into account
• Tools can both mitigate and leverage biases to assist user decisions
• Every design choice will impact user behavior
• Good tools can have a positive impact on user behaviors
• Usability testing can help to assess the effectiveness of privacy tools