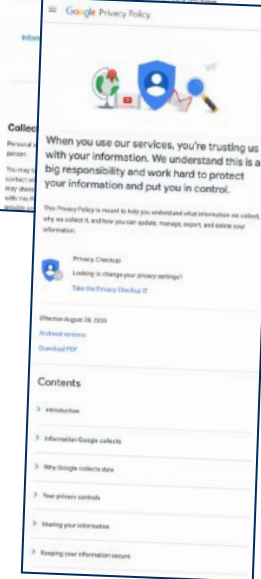
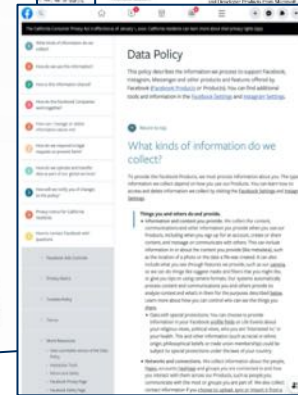
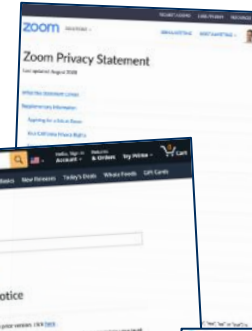
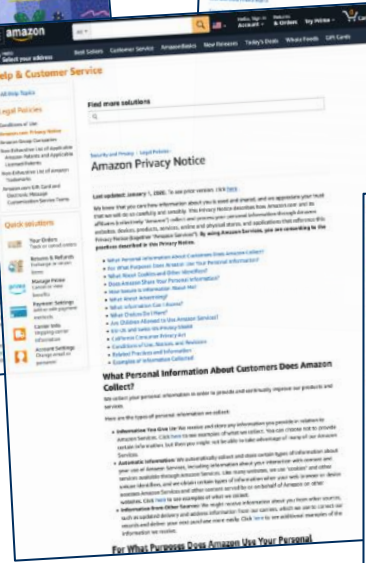


How to (In)Effectively Convey Privacy Choices with Icons and Link Text

Florian Schaub & Lorrie Cranor

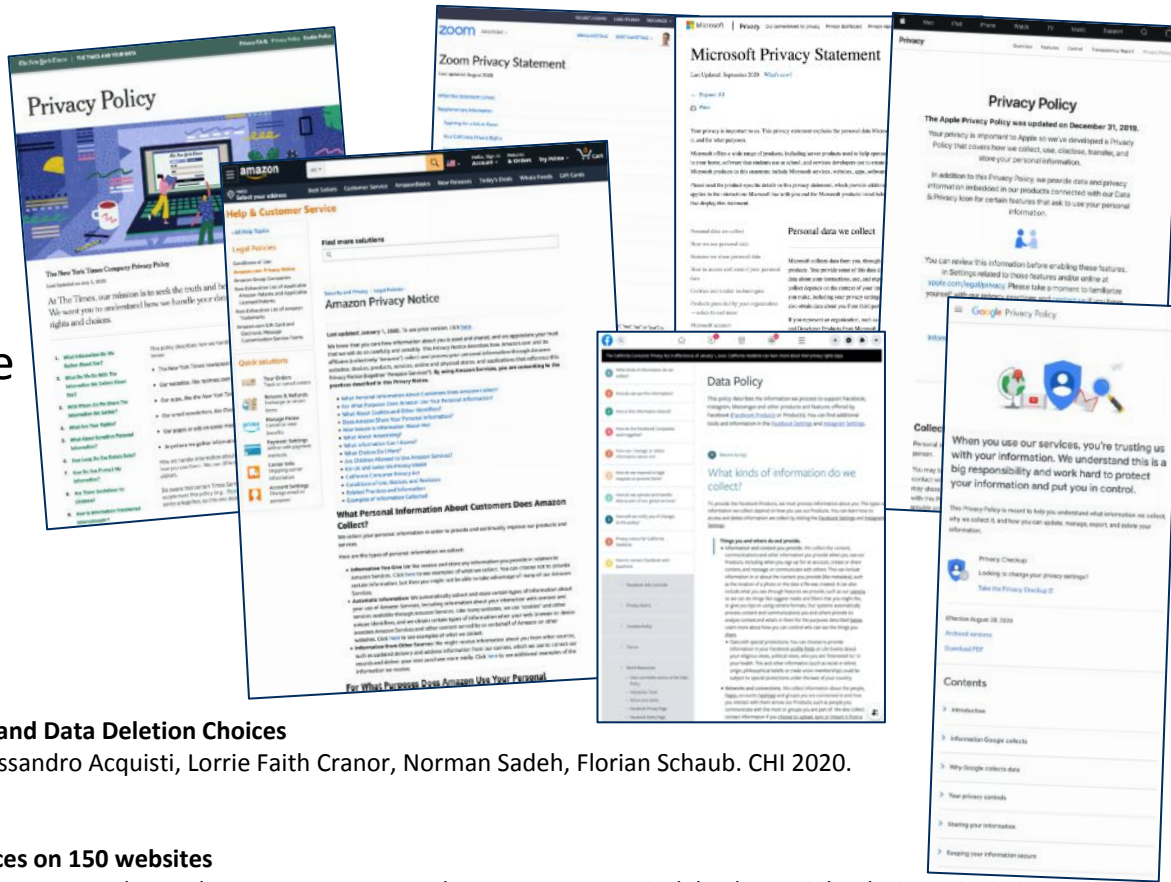
Privacy Notices

- lengthy
- full of jargon
- abstract



Privacy Choices

- Difficult to find
- Spread out across service
- Inconsistent options



“It’s a scavenger hunt”: Usability of Websites’ Opt-Out and Data Deletion Choices

Hana Habib, Sarah Pearman, Jiamin Wang, Yixin Zou, Alessandro Acquisti, Lorrie Faith Cranor, Norman Sadeh, Florian Schaub. CHI 2020.

<https://doi.org/10.1145/3313831.3376511>

An empirical analysis of data deletion and opt-out choices on 150 websites

Hana Habib, Yixin Zou, Aditi Jannu, Neha Sridhar, Chelse Swoopes, Alessandro Acquisti, Lorrie Faith Cranor, Norman Sadeh, Florian Schaub. SOUPS 2019.

<https://www.usenix.org/conference/soups2019/presentation/habib>

Icons to the rescue

Icons ...

- guide attention
- communicate concepts concisely
- can be language & culture independent
- help with recognition



Icons to the rescue

Icons ...

- guide attention
- communicate concepts concisely
- can be language & culture independent
- help with recognition

Privacy Icons ...

- draw attention
- communicate privacy concepts
- help identify data practices and privacy choices

Icons to the rescue

Icons increasingly encouraged in regulation



GDPR



CCPA

...

Icons to the rescue?

Mozilla Privacy Icons

2011



https://wiki.mozilla.org/Privacy_Icons

Icons to the rescue?

Mozilla Privacy Icons

2011



Retention period

3 months vs. stored indefinitely



Third-party use

Intended use only vs. limited re-use



Data shared with ad networks

No vs. ad-share with opt-out



Law enforcement

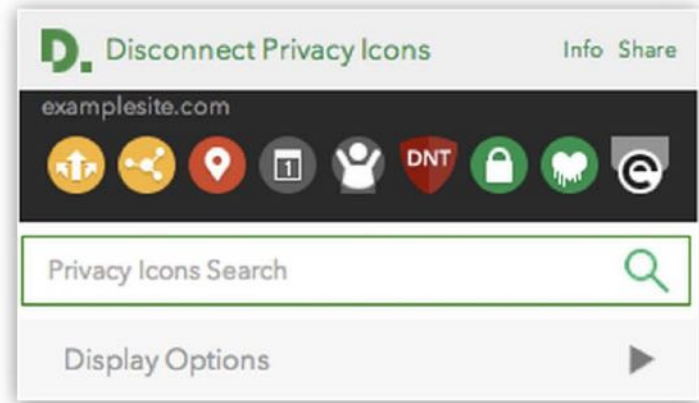
statutory vs. transparent process

https://wiki.mozilla.org/Privacy_Icons

Icons to the rescue?

Disconnect Privacy Icons

2014



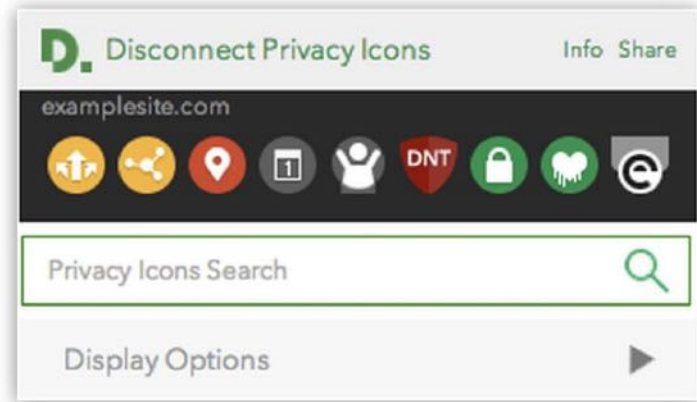
<https://github.com/disconnectme/privacy-icons>

Icons to the rescue?

Disconnect Privacy Icons

2014

<https://github.com/disconnectme/privacy-icons>



Expected use?

Expected collection?

Precise location?

Retention period

Children privacy?

Do Not Track respected?

SSL/TLS?

Affected by HeartBleed SSL bug?

TRUSTe certified?

Icons to the rescue?



Icons to the rescue?



DAA AdChoices icon

Icons to the rescue?



DAA AdChoices icon

What people think happens if they click **AdChoices** 

56% More ads will pop up

45% Let's you buy ads on this page

27% Opt-out of tailored ads

What Do Online Behavioral Advertising Disclosures Communicate to Users?

P. Leon, J. Cranshaw, L. Cranor, J. Graves, M. Hastak, B. Ur, G. Xu. WPES 2012

Icons to the rescue?

Many more examples

- **DaPIS: an Ontology-based Data Protection Icon Set**
Arianna Rossi & Monica Palmirani. Knowledge of the Law in the Big Data Age. Frontiers in AI and Applications. 2019.
<http://gdprbydesign.cirsfid.unibo.it/dapis-2/>
- **Trustworthy Privacy Indicators: Grades, Labels, Certifications and Dashboards**
Joel Reidenberg, N. Cameron Russell, Vlad Herta, William Sierra-Rocafort, Thomas B. Norton. Washington University Law Review, Vol. 96, No. 6, 2019. <https://ssrn.com/abstract=3342747>
- **Is This Thing On? Crowdsourcing Privacy Indicators for Ubiquitous Sensing Platforms**
Serge Egelman, Raghudeep Kannavara, and Richard Chow. CHI 2015. <https://doi.org/10.1145/2702123.2702251>
- **Is your inseam a biometric? a case study on the role of usability studies in developing public policy**
Balebako, Rebecca, Richard Shay, Lorrie Cranor. Workshop on Usable Security. 2014.
<https://www.ndss-symposium.org/ndss2014/workshop-usable-security-usec-2014-programme/your-inseam-biometric-case-study-role-usability-studies-developing-public-policy/>
- **Towards Displaying Privacy Information with Icons**
Leif-Erik Holtz, Katharina Nocun, Marit Hansen. In: Privacy and Identity Management for Life. 2010.
https://doi.org/10.1007/978-3-642-20769-3_27
- ...

privacy icon design is hard

our focus:

icons to indicate privacy choice

CHAPTER 20. CALIFORNIA CONSUMER PRIVACY ACT REGULATIONS

PROPOSED TEXT OF REGULATIONS

§ 999.315. Requests to Opt-Out

(a) A business shall provide two or more designated methods for submitting requests to opt-out, including, at a minimum, an interactive webform accessible via a clear and conspicuous link titled “Do Not Sell My Personal Information,” or “Do Not Sell My Info,” on the business’s website or mobile application. Other acceptable methods for submitting these requests include, but are not limited to, a toll-free phone number, a designated email address, a form

(e) Opt-Out Button or Logo

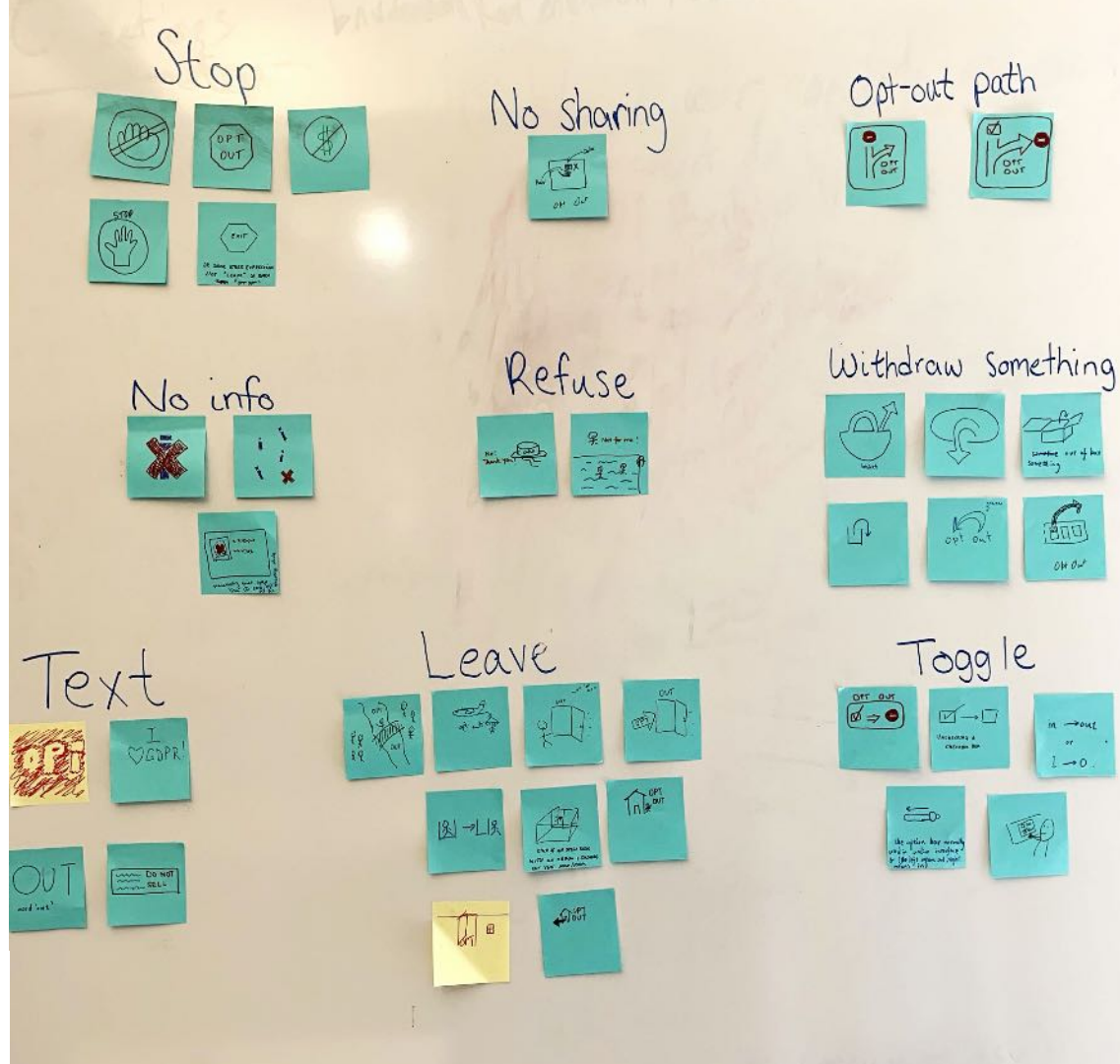
(1) The following opt-out button or logo may be used in addition to posting the notice of right to opt-out, but not in lieu of any posting of the notice. [BUTTON OR LOGO TO BE ADDED IN A MODIFIED VERSION OF THE REGULATIONS AND MADE AVAILABLE FOR PUBLIC COMMENT.]

Icon development and evaluation

1. Icon ideation
2. Preliminary icon evaluation
3. Refinement of most promising icons
4. Testing of refined icons
5. Link text ideation
6. Link text evaluation
7. Combined icon and link text evaluation

Icon ideation focused on 3 concepts

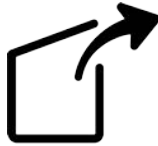
- Choice/consent
- Opting out
- Do-not-sell



Choice/consent



Opting out



Do not sell (personal info)



DAA Privacy
Rights

First icon evaluation

- 240 Mturk participants
- Tested 12 icons with and without “Do Not Sell My Personal Information” tagline
- Displayed 1 icon
 - Asked what the icon means and what would happen if you click on it
- Displayed all 12 icons
 - Asked which best conveyed Do Not Sell and Privacy Choices concepts

Icons difficult to interpret without words



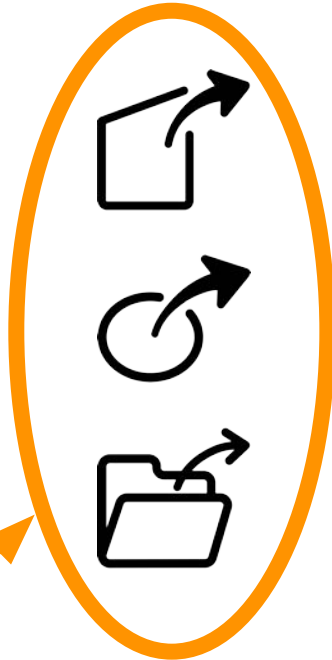
best conveys choices about personal info



best conveys do not sell my personal info, but also conveys payments



mostly confusing



people didn't recognize stop sign



Refined icons for evaluation

ID-Card



Slash-Dollar



Stop-Dollar

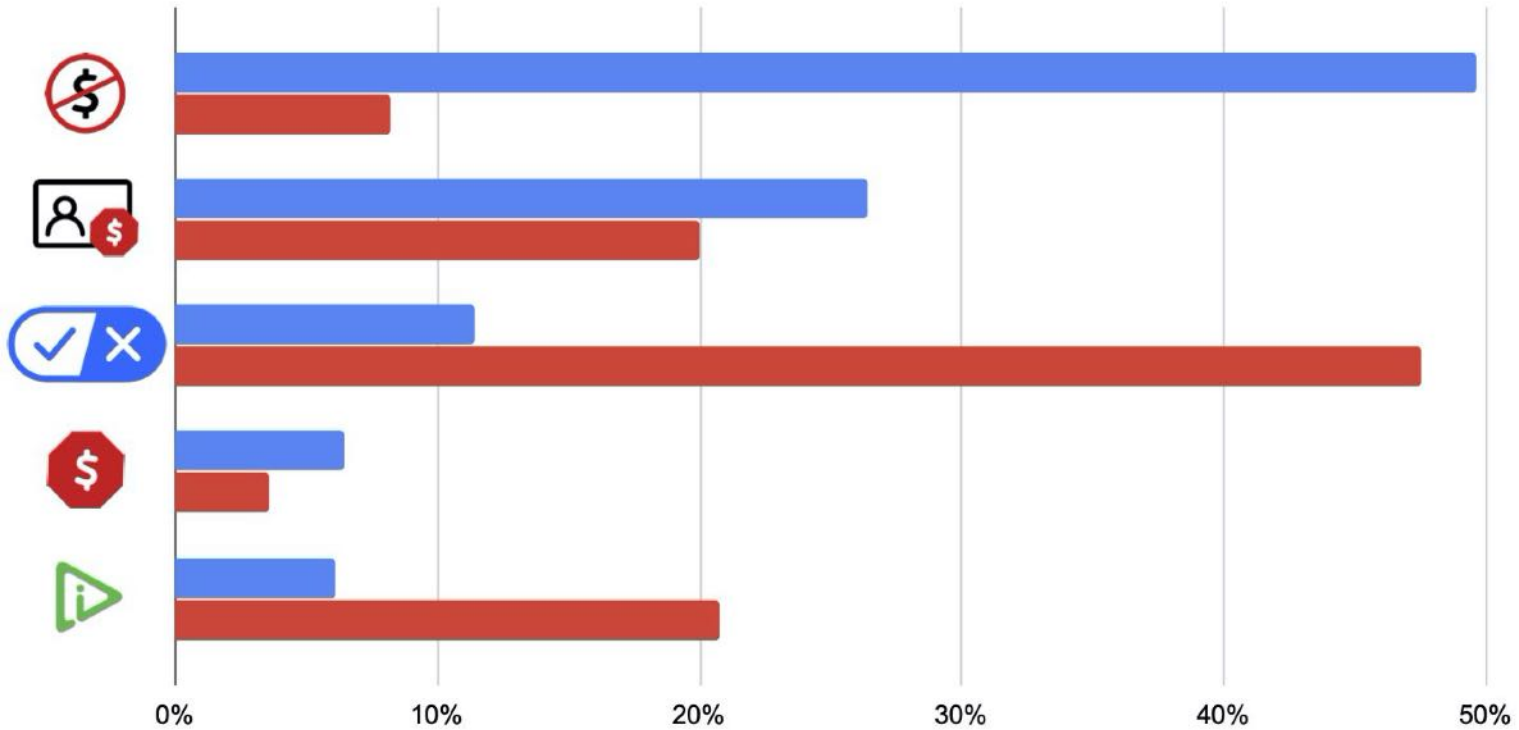


Toggle






DAA





Best conveys **do not sell my personal information**

Best conveys **choices about the use of personal information**

Icon	Common Interpretations without tagline (# of participants)
Toggle 	<ul style="list-style-type: none"> ✓ accept/decline something (11) ✓ activate/deactivate something (5) ● okay/exit options (4) ● mark as true/false (4)
DAA 	<ul style="list-style-type: none"> ● get more information (15) ● start audio/video content (7) ● denotes website is safe or private (3) ● move forward or next (2)
Slash-dollar 	<ul style="list-style-type: none"> ● something is free or requires no money (12) ● cash/dollars not accepted (7) ● money (4) ✓ selling is not allowed (1)

✓ **correct interpretation**

● **misconception**

Tagline ideation

- Do Not Sell My **Personal Information**
- Do Not Sell **My Info**

Tagline ideation

- Do Not Sell My **Personal Information**
- Do Not Sell **My Info**
- **Don't Sell My Info**
- **Do Not Sell**
- **Don't Sell**

Tagline ideation

- Do Not Sell My **Personal Information**
- Do Not Sell **My Info**
- Don't Sell **My Info**
- Do Not Sell
- Don't Sell
- Do-Not-Sell **Choices**
- Do-Not-Sell **Options**
- Do-Not-Sell **Opt-Outs**

Tagline ideation

- Do Not Sell My **Personal Information**
 - Do Not Sell **My Info**
 - Don't Sell **My Info**
 - Do Not Sell
 - Don't Sell
 - Do-Not-Sell **Choices**
 - Do-Not-Sell **Options**
 - Do-Not-Sell **Opt-Outs**
- **Privacy Choices**
 - **Privacy Options**
 - **Privacy Opt-Outs**

Tagline ideation

- Do Not Sell My **Personal Information**
- Do Not Sell **My Info**
- Don't Sell **My Info**
- Do Not Sell
- Don't Sell
- Do-Not-Sell **Choices**
- Do-Not-Sell **Options**
- Do-Not-Sell **Opt-Outs**
- **Privacy Choices**
- **Privacy Options**
- **Privacy Opt-Outs**
- **Personal Info Choices**
- **Personal Info Options**
- **Personal Info Opt-Outs**




Tagline ideation

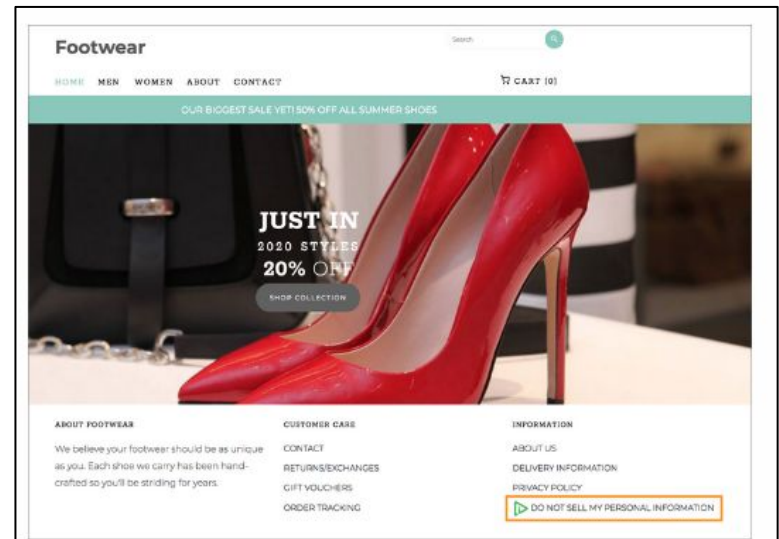
- Do Not Sell My **Personal Information**
- Do Not Sell **My Info**
- Don't Sell **My Info**
- Do Not Sell
- Don't Sell
- Do-Not-Sell **Choices**
- Do-Not-Sell **Options**
- Do-Not-Sell **Opt-Outs**
- **Privacy Choices**
- **Privacy Options**
- **Privacy Opt-Outs**
- **Personal Info Choices**
- **Personal Info Options**
- **Personal Info Opt-Outs**
- **Do Not Sell My Info Choices**
- **Do Not Sell My Info Options**

Tagline testing

- 540 Mturk participants
- “Sell” often misunderstood without “personal information” or “info”
- “Do not sell my personal information” and “Do not sell my info” conveyed narrow choice effectively, but did not convey general privacy choices
- “Options” and “choices” more effective than “opt-outs”
- Most promising new taglines:
 - Privacy choices, Privacy options, Personal info choices

Combo testing

- Mturk study with 1,416 participants
- Tested 3 icons + no icon
 - 
 - 
 - 
- Tested 5 taglines + no tagline
 - Do not sell my personal information
 - Do not sell my info
 - Privacy choices
 - Privacy options
 - Personal info choices
- 23 combinations tested



Close up of highlighted area:



What do you think would happen if you clicked on the symbol and link in the highlighted area on this web page?

Combo testing results

- Misconceptions
 - “Personal info choices” conveyed info about shoe sizes, site settings, payment methods, etc.
 - Slash-dollar icon sometimes suggested payment options and encrypted payments (42 participants)
 - Toggle icon occasionally suggested it was a real toggle (6 participants)
- None of the icons were very good without a tagline
 - Slash-dollar was especially bad
- Icons didn’t have much impact on interpretation of taglines

Recommendations to OAG

Privacy Options

- This allows consumers to look for one button
- Prevent the proliferation of buttons

Do Not Sell My Personal Information

- Complies with CCPA as written

Our
recommended
icon



iOS toggle
switch



OAG's revised proposed regulations

- (1) The following opt-out button or logo may be used in addition to posting the notice of right to opt-out, but not in lieu of any posting of the notice of right to opt-out.



- (2) When the opt-out button is used, it shall appear to the left of the “Do Not Sell My Personal Information” or “Do Not Sell My Info” link, as demonstrated below, and shall be approximately the same size as other buttons on the business’s webpage. ~~[BUTTON OR LOGO TO BE ADDED IN A MODIFIED VERSION OF THE REGULATIONS AND MADE AVAILABLE FOR PUBLIC COMMENT.]~~



Twitter responds



Alex Stamos  @alexstamos · 14h 

Quick, tell me what that button indicates in its current state. Are you opted into your data being used or out? Red X next to "Do Not", so does that cancel out the not?

The California AG's office is now mandating really bad interaction design.
Great job everybody



Aaron Alva @aalvatar · 2h 

This is terribly confusing. Was this disclosure user tested to make sure users' expectations align with what you're trying to convey? (Likely not)

We expect companies to do user testing; we should expect governments to do same.

one resource: ftc.gov/news-events/ev... #CCPA

So we ran another study

Stylized toggle



CalAG toggle



CalAG-X toggle



+ swapped colors

- Insignificant difference between icons with the big and small X
- But big differences between the CalAG icon and our stylized toggle
- CalAG icon more likely to be misinterpreted as actual toggles
- Small differences based on color
- **Some small changes can sometimes make a big difference and you won't know unless you test with users**

Then the OAG removed the button

- Button completely removed from regulation
- OAG said they will design a uniform and recognizable opt-out button in the future
- But websites can use our recommended stylized toggle now to direct consumers to privacy choices all in one place






Testing privacy indicators 101

- Involve people from the start
- What to test
 - Attention – is the icon noticeable?
 - Discoverability – is the icon findable and recognizable?
 - **Comprehension – what does the icon mean?**
 - **Expectation – what happens if you click?**
 - Utility – is the choice behind the icon useful?
 - Behavior – do people click the icon?




Testing privacy indicators 101

- How to test
 - A/B testing
 - Online studies
 - fast
 - relatively inexpensive
 - user testing platforms (Prolific, UserTesting, DScout)
 - or panel of own users
 - Testing in context
 - Mockups
 - Prototypes
 - Production systems

Take aways

- Icon design is hard – involve users and test, test, test!
- Privacy choice icons rooted in simple and familiar concepts 
- Icons should be accompanied by link text  **Privacy Options**
- Wide adoption != good icon design 
- Privacy indicators only one part of usable privacy choices
- Standardize privacy indicators

Take aways

- Icon design is hard – involve users and test, test, test!
- Privacy choice icons rooted in simple and familiar concepts 
- Icons should be accompanied by link text  **Privacy Options**
- Wide adoption != good icon design 
- Privacy indicators only one part of usable privacy choices
- Standardize privacy indicators

This project is joint work with Hana Habib, Yixin Zou, Alessandro Acquisti, Joel Reidenberg, and Norman Sadeh. For our research papers see cups.cs.cmu.edu/optout

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Florian Schaub – fschaub@umich.edu

