An Empirical Analysis of Data Deletion and Opt-Out Choices on 150 Websites

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Carnegie Mellon University

University of Michigan
Privacy Choices Are Mandated

European Union

The United States

GDPR

CAN-SPAM Act

COPPA
Children’s Online Privacy Protection Act

DIGITAL ADVERTISING ALLIANCE
Examples of Privacy Choices

EMAIL PREFERENCES
Unsubscribe
Email Address:
Unsubscribe if you no longer wish to receive email updates from Lord & Taylor.

I would like to request the following regarding my personal information:

- Update it
  Make changes described in comments field.
- Limit its processing
  Use it only for the services I requested.
- Port it
  Show me what I have shared and posted.
- Access it
  Show me what I have shared and posted, as well as what's been collected about me.
- Restrict processing it
  Stop using my personal information, which will end my ability to use the respective service(s).
- Delete it
  Remove my personal information, which will end my ability to use the respective service(s).

Submit Your Preference
- Personalize Ads from Amazon
- Do Not Personalize Ads from Amazon for this Internet Browser

Submit
User Attitudes and Behaviors

65% said it’s “very important” to them to control what information is collected about them.

86% had taken steps to remove or mask their digital footprints.

# Usability Issues of Privacy Choices

<table>
<thead>
<tr>
<th>Large-scale measurement studies</th>
<th>Small-scale user studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cranor et al., TWEB ’16</td>
<td>• Komanduri et al., ISJLP ’11</td>
</tr>
<tr>
<td>• Libert, WWW ’18</td>
<td>• Leon et al., CHI ’12</td>
</tr>
<tr>
<td>• Degeling et al., NDSS ’19</td>
<td>• Ur et al., SOUPS ’12</td>
</tr>
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<td>• Zimmeck et al., PETS ’19</td>
<td></td>
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</table>

Our Study
Our Study…

A **manual, in-depth** content analysis of privacy choices on 150 websites.

- Opt-outs for **email communications**
- Opt-outs for **targeted ads**
- Choices for **data deletion**
Research Questions

1. **What** choices related to email communications, targeted advertising, and data deletion do websites offer?

2. **How** are websites presenting these privacy choices to their visitors, and what are the potential **usability** issues?
Analysis Procedure

1. Visit home page
2. Create a user account
Analysis Procedure

3. Visit privacy policy

4. Visit account settings
Analysis Template

Location
Privacy Policy? Account Settings? Other places?

Level of detail
Specific types of communications that can be opted out?

Link availability
One or multiple links? Broken or not?

Interaction path
Clicks? Form fields? Other user actions required?
Sampling Strategy

150 English-language websites sampled from Alexa’s global top 10,000 sites (Mar. 2018).

<table>
<thead>
<tr>
<th>Category</th>
<th>Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top traffic (50)</td>
<td>1-200</td>
</tr>
<tr>
<td>Middle traffic (50)</td>
<td>201-5,000</td>
</tr>
<tr>
<td>Bottom traffic (50)</td>
<td>&gt;5,000</td>
</tr>
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All sites were analyzed between Apr. and Oct. 2018 ($\kappa = 0.82$).

Amazon Alexa Top Sites: https://www.alexa.com/topsites
Website Locations

Analysis only shows the status quo for US-based users.

- Unknown, 10%
- Africa, 3%
- Asia, 7%
- Europe, 17%
- Central America, 1%
- US, 62%
What did we find for website privacy choices?
Findings of Website Privacy Choices

Presence

Description

Usability
Findings of Website Privacy Choices

Presence

Privacy choices commonly offered on all websites across different traffic tiers.

Description

Usability
Privacy Choices Are Common

Other opt-outs:

- Web analytic services (21)
- Third-party sharing (17)
- Do-Not-Track (8)
- Cookies (5)
Location of Privacy Choices

- Account Settings Only
- Privacy Policy Only
- More Than One Location
Location of Privacy Choices

- Account Settings Only
- Privacy Policy Only
- More Than One Location

Bar chart showing the number of websites with privacy choices located at different positions:
- Top
- Middle
- Bottom

Legend:
- Red: Account Settings Only
- Blue: Privacy Policy Only
- Green: More Than One Location
Location of Privacy Choices

- Account Settings Only
- Privacy Policy Only
- More Than One Location

Number of Websites

<table>
<thead>
<tr>
<th></th>
<th>Top</th>
<th>Middle</th>
<th>Bottom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Comm.</td>
<td>10</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Targeted Adv.</td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Data Deletion</td>
<td>15</td>
<td>5</td>
<td>5</td>
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Findings of Website Privacy Choices

Presence

Description

Privacy choices text has poor readability.

Usability
# Poor Readability in Text Description

Flesch-Kincaid Grade Level (FGL) scores

<table>
<thead>
<tr>
<th>Categories</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Communications</td>
<td>13.89</td>
</tr>
<tr>
<td>Targeted Advertising</td>
<td>13.72</td>
</tr>
<tr>
<td>Data Deletion</td>
<td>14.28</td>
</tr>
<tr>
<td>Privacy Policies Overall</td>
<td>10.20</td>
</tr>
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Text requires university-level reading abilities!
Findings of Website Privacy Choices

Presence

Description

Usability

No dominant wording for section headings.
No Dominant Wording for Headings

<table>
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<tr>
<th>N-Gram</th>
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<td>your choic*</td>
<td>11</td>
<td>9</td>
<td>10</td>
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“*” is a place holder for one or more letters that follow the beginning pattern.
No Dominant Wording for Headings

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<td>7</td>
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No single n-gram occurred in >20 analyzed policies.

“*” is a place holder for one or more letters that follow the beginning pattern.
Various Headings for Data Deletion

- Box: Your Choices
- Netflix: Data Subject’s rights
- LinkedIn: 4.2 Rights to Access and Control Your Personal Data
- Facebook: How can I manage or delete information about me?
Findings of Website Privacy Choices

Presence

Description

Ambiguity in what happens after exercising the choice.

Usability
Ambiguity in Targeted Ads Opt-outs

Among 80 sites that offered targeted ads opt-outs:

50% did not specify if it also applies to tracking.

90% did not specify if it works across multiple browsers or devices.
Ambiguity in Data Deletion Choices

Among 108 sites that offered data deletion:

83% did not describe **when** the account would be permanently deleted.
Findings of Website Privacy Choices

Presence

Description

Usability

Exercising privacy choices requires many actions.
Average Number of Actions

Actions we counted:

• Clicks
• Hovers
• Checkboxes
• Form fields

Average number for the shortest path:

5.3 for email opt-outs and data deletion choices.

3.2 for targeted ads opt-outs.
Request Form

Please use this form to initiate processing your personal data request.

To unsubscribe from any marketing or newsletter emails from the New York Times, please select the 'unsubscribe' link at the bottom of each email.

To change or cancel your subscription, please contact Customer Care

I would like to request the following regarding my personal information:

- [ ] Update it
  Make changes described in comments field.

- [ ] Limit its processing
  Use it only for the services I requested.

- [ ] Port it
  Show me what I have shared and posted.

- [ ] Access it
  Show me what I have shared and posted, as well as what's been collected about me.

- [ ] Restrict processing it
  Stop using my personal information, which will end my ability to use the respective service(s).

- [x] Delete it
  Remove my personal information, which will end my ability to use the respective service(s).

Please select the New York Times Company products and services for which you would like us to review and apply your personal data request towards:

Choose the area to which your request applies:
Findings of Website Privacy Choices

Presence

Description

Usability

Multiple links leading to different opt-out tools.
Links to Multiple Opt-outs

1. Twitter implemented
2. DAA

Privacy Policy

Account Settings

“About Ads” page
Findings of Website Privacy Choices

Presence

Description

Usability Poor design choices.
Promotional Emails

Send me notifications from the following categories and new categories as they become available.

- Amazon Cloud Cam
- Amazon Invites
- Alexa
- Amazon Appstore
- Amazon Books - physical stores
- Amazon Dash Button
- Amazon Echo
- Amazon Family
- Amazon Fresh
- Amazon Game Studios
- Amazon Home Services
- Amazon Marketplace
- Amazon Move
- Amazon Music Unlimited
- Amazon News
- Amazon Outfit Compare
- Amazon Partners
- Amazon Pop-Ups
- Amazon Prime Marketing Communications
- Amazon Registry Services
- Amazon Returns
- Amazon Reviews
- Amazon Seller App
- Amazon Surveys
- Friends & Social Networks
- Furniture
- General Offers
- Grocery
- Health & Personal Care
- Home, Garden & Pets
- Industrial & Scientific
- Jewelry
- Kindle & Fire Devices
- Kindle Books
- Kindle eperiodicals
- Local Services
- MP3 Downloads
- Magazine Subscriptions
- Movies & TV
- Music
- Musical Instruments
- News
- Office Products & Supplies
- PillPack
- Prime Music
- Prime Now
- Prime Student
- Prime Video
- Restaurants
- Safety & Supplies
- Science & Office Supplies
- Security
- Sports & Entertainment
- Store Locations
- Style
- Support
- Technology
- Toyota
- Udemy
- Video Games
- Woot
How do we improve website privacy choices?
Improving Website Privacy Choices

Planning
- Determining what to do

Translation
- Determining how to do it

Physical action
- Doing it

Assessment
- Determining outcomes via feedback

Improving Website Privacy Choices

Planning

Translation

Physical action

Assessment

Standardize section headings in privacy policies.
# Standardize Policy Section Headings

## WHAT DOES [NAME OF FINANCIAL INSTITUTION] DO WITH YOUR PERSONAL INFORMATION?

<table>
<thead>
<tr>
<th>FACTS</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why?</td>
<td>Financial companies choose how they share your personal information. Federal law gives consumers the right to limit some but not all sharing. Federal law also requires us to tell you how we collect, share, and protect your personal information. Please read this notice carefully to understand what we do.</td>
</tr>
</tbody>
</table>
| What?     | The types of personal information we collect and share depend on the product or service you have with us. This information can include:  
- Social Security number and [income]  
- [account balances] and [payment history]  
- [credit history] and [credit scores] |
| How?      | All financial companies need to share customers’ personal information to run their everyday business. In the section below, we list the reasons financial companies can share their customers’ personal information; the reasons [name of financial institution] chooses to share; and whether you can limit this sharing. |
Improving Website Privacy Choices

Planning
Translation
Physical action
Assessment

Simplify the process of learning opt-outs.
1. Twitter implemented
2. DAA

Unify multiple choice mechanisms into a single interface.
Help users distinguish different opt-out tools.
Improving Website Privacy Choices

Planning

Translation

Physical action

Assessment

Reduce number of actions to exercise choices.
Reduce Number of User Actions

Add the option “delete my account from all NYT services.”

Convert this to a list of checkboxes.
Reduce Number of User Actions

Do not send me any marketing email for now
Regulation Needs to Combat Dark Patterns

CNIL Fines Google €50 Million for Alleged GDPR Violations

For alleged failure to...
• Provide notice in an **accessible** form.
• Obtain **valid** user consent to data processing for ad personalization.
Describe what privacy choices achieve clearly.
Describe What Privacy Choices Do

Online Behavioral Advertising. This program offers a centralized location where users can make choices about the use of their information for online behavioral advertising. To learn more and to make choices about the use of your information for online behavioral advertising on websites, please click here. Please note that if you exclude online behavioral advertising using this method, this choice will only apply to the specific browser or device from which you opt out.

If you would like to cancel your account or delete your User Personal Information, you may do so in your user profile. We will retain and use your information as necessary to comply with our legal obligations, resolve disputes, and enforce our agreements, but barring legal requirements, we will delete your full profile (within reason) within 90 days. You may contact GitHub Support or GitHub Premium Support to request the erasure of the data we process on the basis of consent within 30 days.
Summary

Privacy choices are **prevalent** on websites.

Severe issues exist regarding their **description** and **usability**.

**Companies** and **regulators** must ensure usability of privacy choices.

**Yixin Zou**

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