

Lecture 11: Opt-out of Sale

CS 181E

Fall 2026

Review: Online Tracking



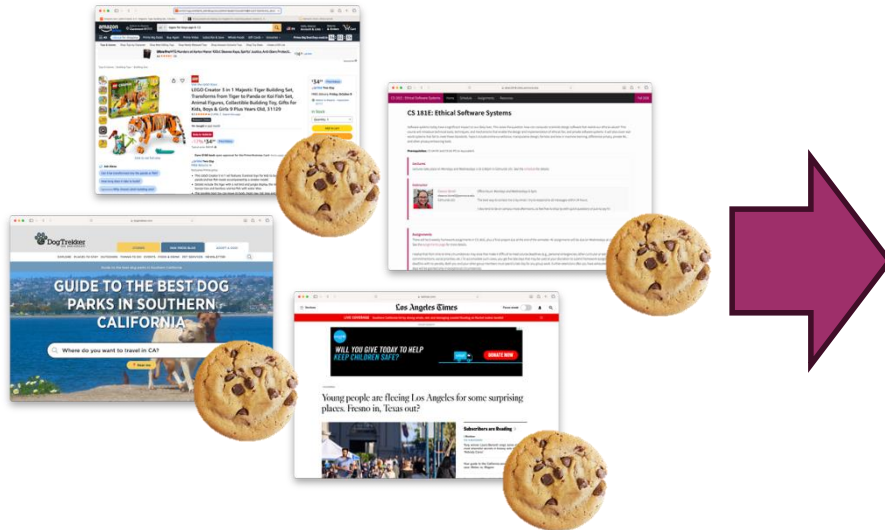
Review: Third-Party Tracking Cookies

The screenshot shows a web browser displaying the Los Angeles Times website. The browser's address bar shows "latimes.com". The website header includes the "Los Angeles Times" logo, a "Sections" menu, a "Focus mode" toggle, and user/account icons. A blue advertisement banner for "Prime Big Deal Days" with the text "Home finds under \$30" and a "Shop now" button is visible. Below the ad, the article title "Young people are fleeing Los Angeles for some surprising places. Fresno in, Texas out?" is displayed, along with a small image of a man. To the right of the article, a section titled "Subscribers are Reading" includes a "Review" link and a snippet of text: "Why this hidden gem is the new crown jewel of L.A. fine dining".

At the bottom of the browser window, a network inspector tool is open, showing a list of network requests. The "Name" column lists requests such as "young-people-are-fleeing-los-angeles-...", "admi", "about:blank", "about:srcdoc", "activeview", "event", and "3pEvent". The "Domain" column shows "www.latimes.com" for the first few requests and "pagead2.googlesyn...", "prebid-a.rubiconproj...", and "www.btd-cmh.tq-tu..." for the last three. The "Type" column shows "document" for the first four and "fetch" for the last three. The "Initiator" column shows "ujs_web_displ...", "Bootstrap.js:2...", and "adforensics_tw...". The "Trans..." column shows "89 B", "125 B", and "44 B". The "Time" column shows "65.9ms", "78.4ms", and "157ms". A yellow circle highlights the "340" value in the "Trans..." column for the "3pEvent" request. The bottom status bar of the browser shows "7" requests, "340" bytes transferred, "2.73 MB" total size, and "1.84 MB" cache size.

Name	Domain	Type	Initiator	Trans...	Time
young-people-are-fleeing-los-angeles-...	www.latimes.com	document	—	—	—
admi	web-cf-event-cell8	document	—	—	—
about:blank	—	document	—	—	—
about:blank	—	document	—	—	—
about:srcdoc	—	document	—	—	—
activeview	pagead2.googlesyn...	fetch	ujs_web_displ...	89 B	65.9ms
event	prebid-a.rubiconproj...	fetch	Bootstrap.js:2...	125 B	78.4ms
3pEvent	www.btd-cmh.tq-tu...	fetch	adforensics_tw...	44 B	157ms

Review: Targeted Advertising



Your categories

Below you can review the interests and inferred demographics that Google has associated with your cookie. You can [remove](#) or [edit](#) these at any time.



Business & Industrial

Business & Industrial - Manufacturing

Computers & Electronics - Computer Hardware - Laptops & Notebooks - Tablet PCs

Computers & Electronics - Software - Multimedia Software - Photo & Video Software

Computers & Electronics - Software - Operating Systems - Mac OS

Internet & Telecom - Mobile & Wireless - Mobile Phones

Internet & Telecom - Mobile & Wireless - Mobile Phones - Smart Phones

Online Communities - Social Networks

Reference - General Reference - Time & Calendars

Science - Mathematics

Audience Segments

Suggest who should see your ads. You can create new segments in [Audience Manager](#).

Edit targeted segments

Done

Search

Browse

None selected

Clear all



What their interests and habits are

Select one or more segments to target.

Affinity



☐ Banking & Finance



☐ Beauty & Wellness



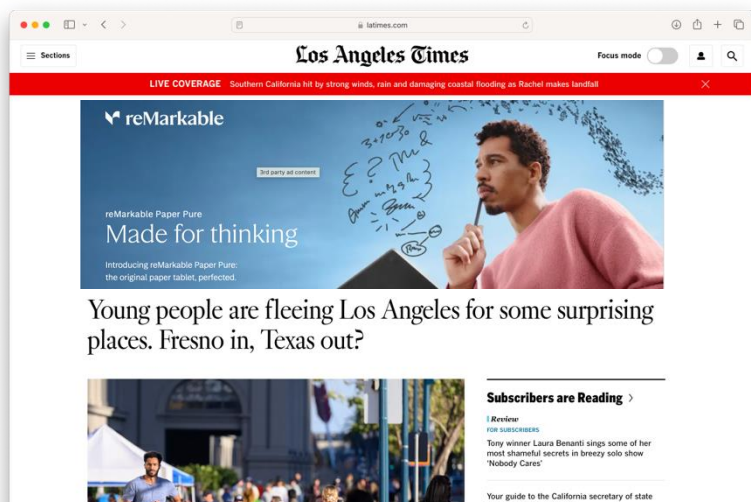
☐ Food & Dining



☐ Home & Garden



☐ Lifestyle & Hobbies



Review: Concerns about Tracking and Ads

- privacy
- discrimination
- other bad societal impact

California Consumer Privacy Act

- **Goal:** Give users more control over their personal information.
- Introduced four key rights:
 1. The right to know
 2. The right to delete
 3. **The right to opt-out of sale**
 4. The right to non-discrimination
- Signed: June 28, 2018
- Enforced: July 1, 2020

The Right to Opt-out of Sale

Users have the right to opt-out of the **sale** of their **personal information**.

Personal information is “information that identifies, relates to, or could reasonably be linked with you or your household.”

- name, SSN, email
- geolocation information
- records of products purchased, internet browsing history
- inferences from other personal info that could create preference profile

Sale includes selling or sharing personal information, specifically including “sharing for cross-context behavioral advertising”

Businesses must provide a **"a clear and conspicuous link"** on the homepage of their website entitled **"Do Not Sell My Personal Information"**.

Allowed language now **"Do Not Sell or Share My Personal Information,"**
"Your Privacy Choices," or **"Your California Privacy Choices."**

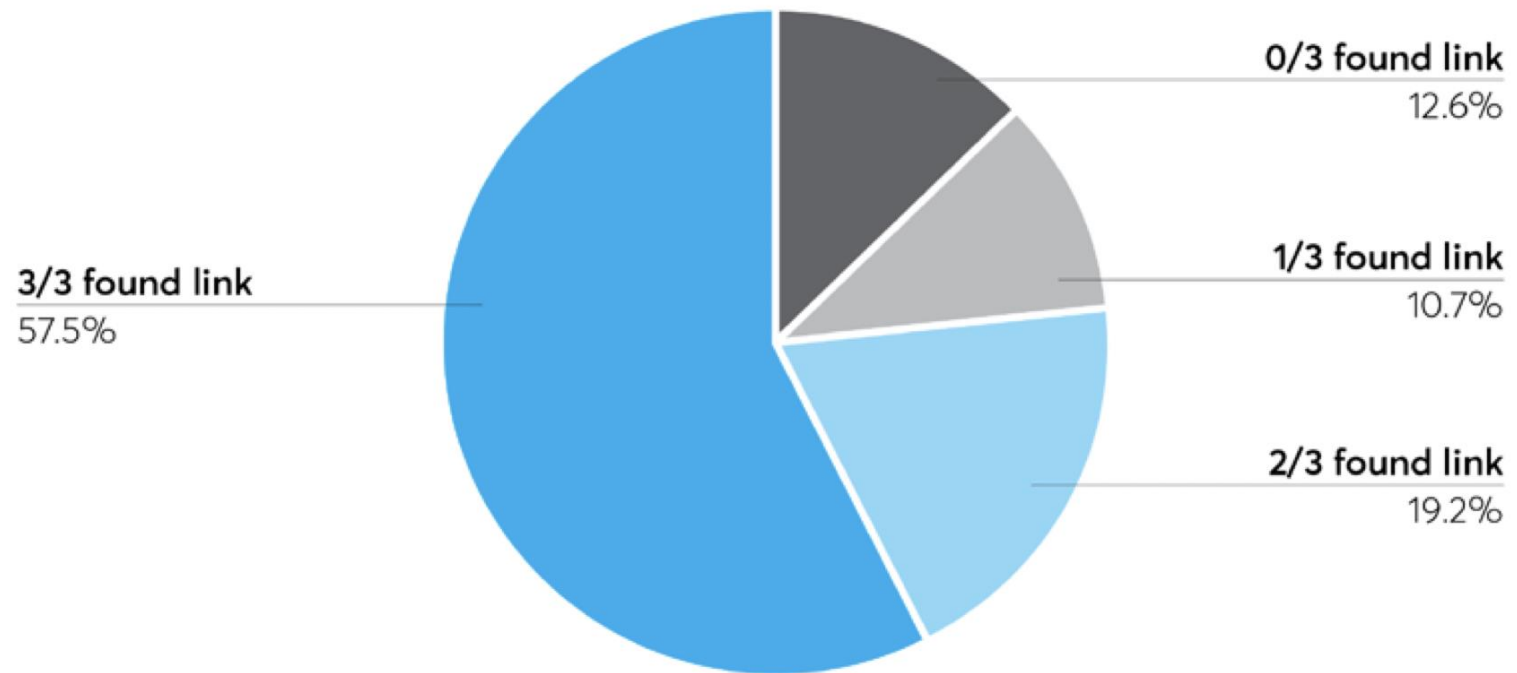
How usable are CCPA opt-outs?

- Consumer Reports study (May 2021)
- identified 234 California data brokers
- randomly assigned people to opt-out of sale on websites
- 403 participants
- analyzed 3 requests each to 214 data brokers



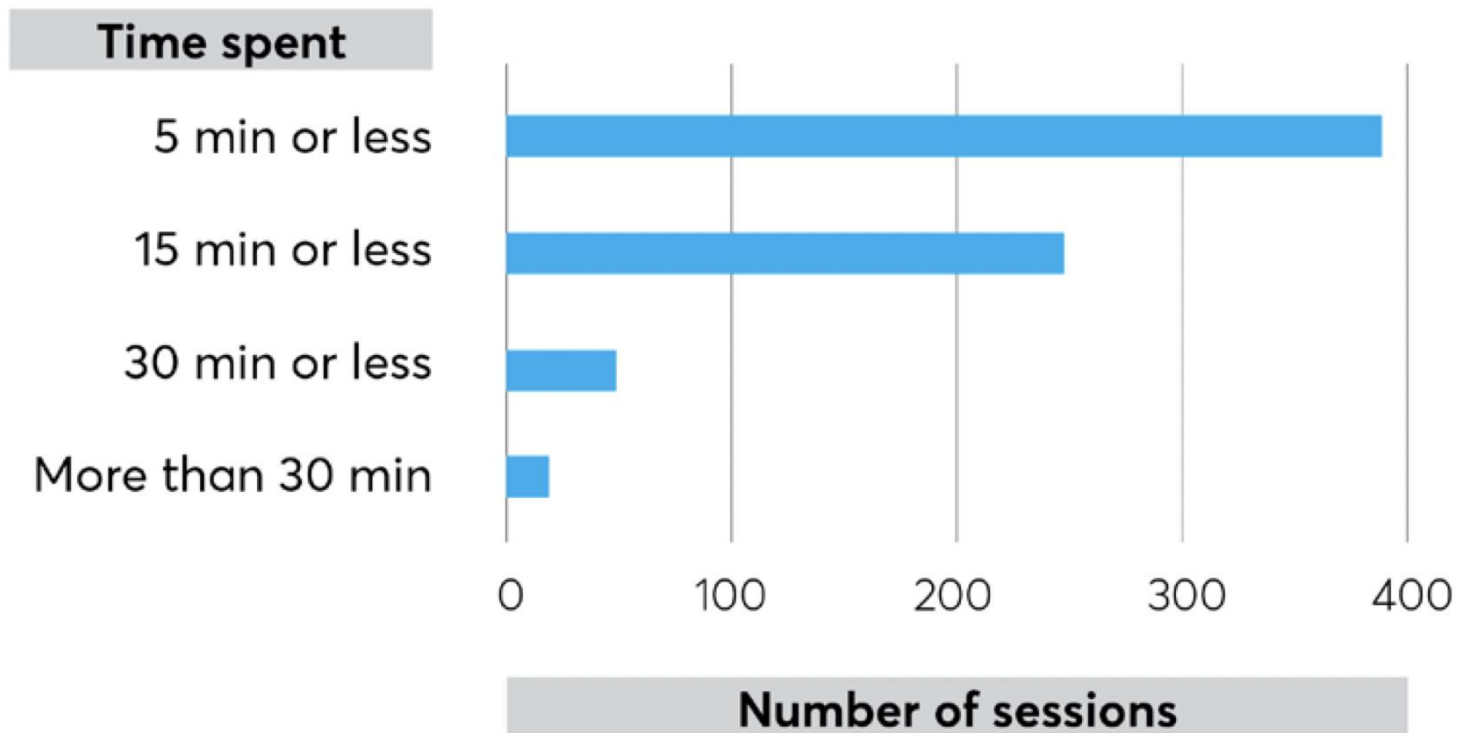
How usable are CCPA opt-outs?

Brokers by number of testers who found DNS link



How usable are CCPA opt-outs?

Sessions By Time Spent



Exercise: Figure out how to opt-out

Example 1: <https://www.theguardian.com/>

Example 2: <https://weather.com/>

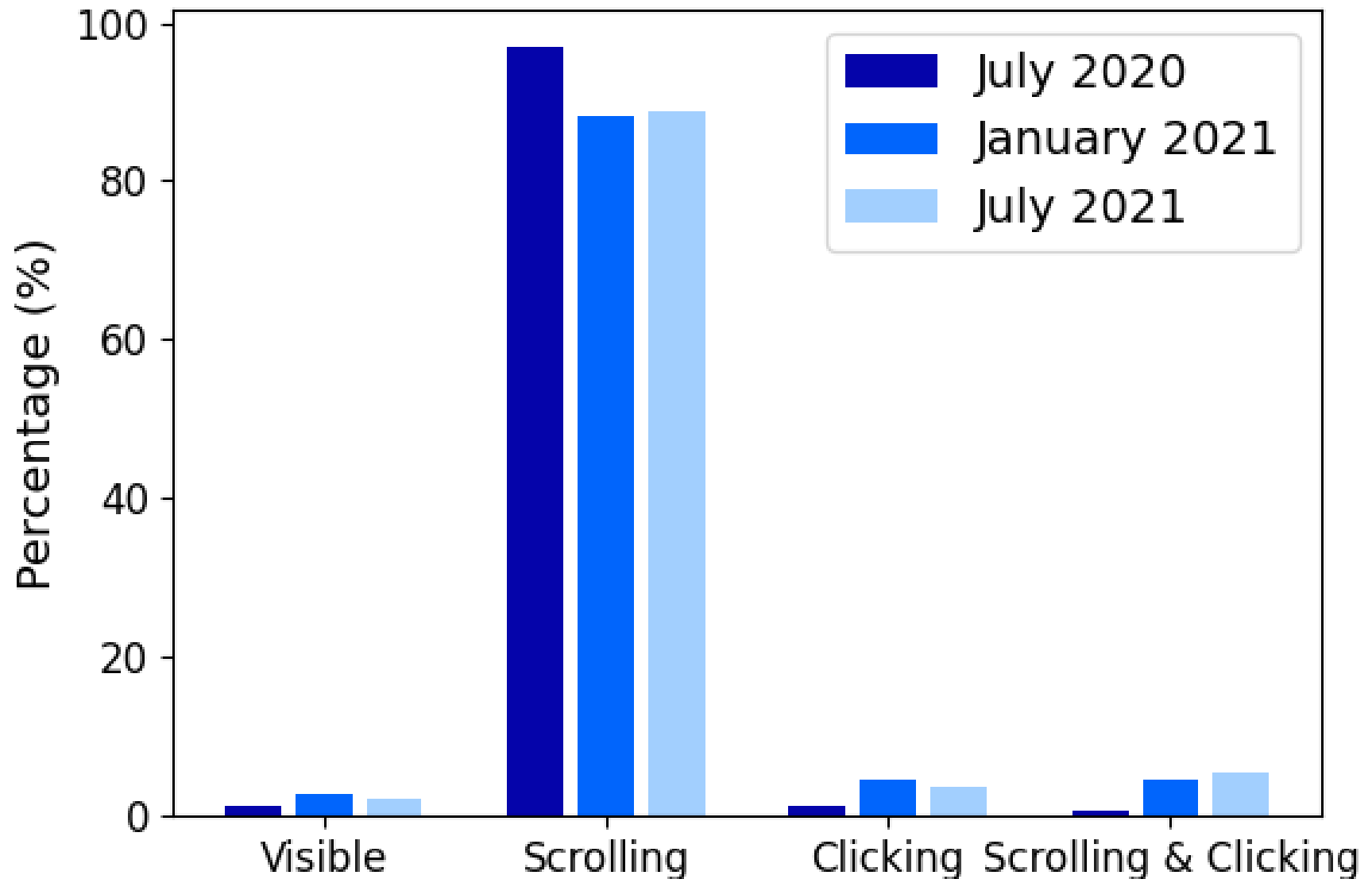
Example 3: <https://www.espn.com>

Example 4: <https://www.buzzfeed.com>

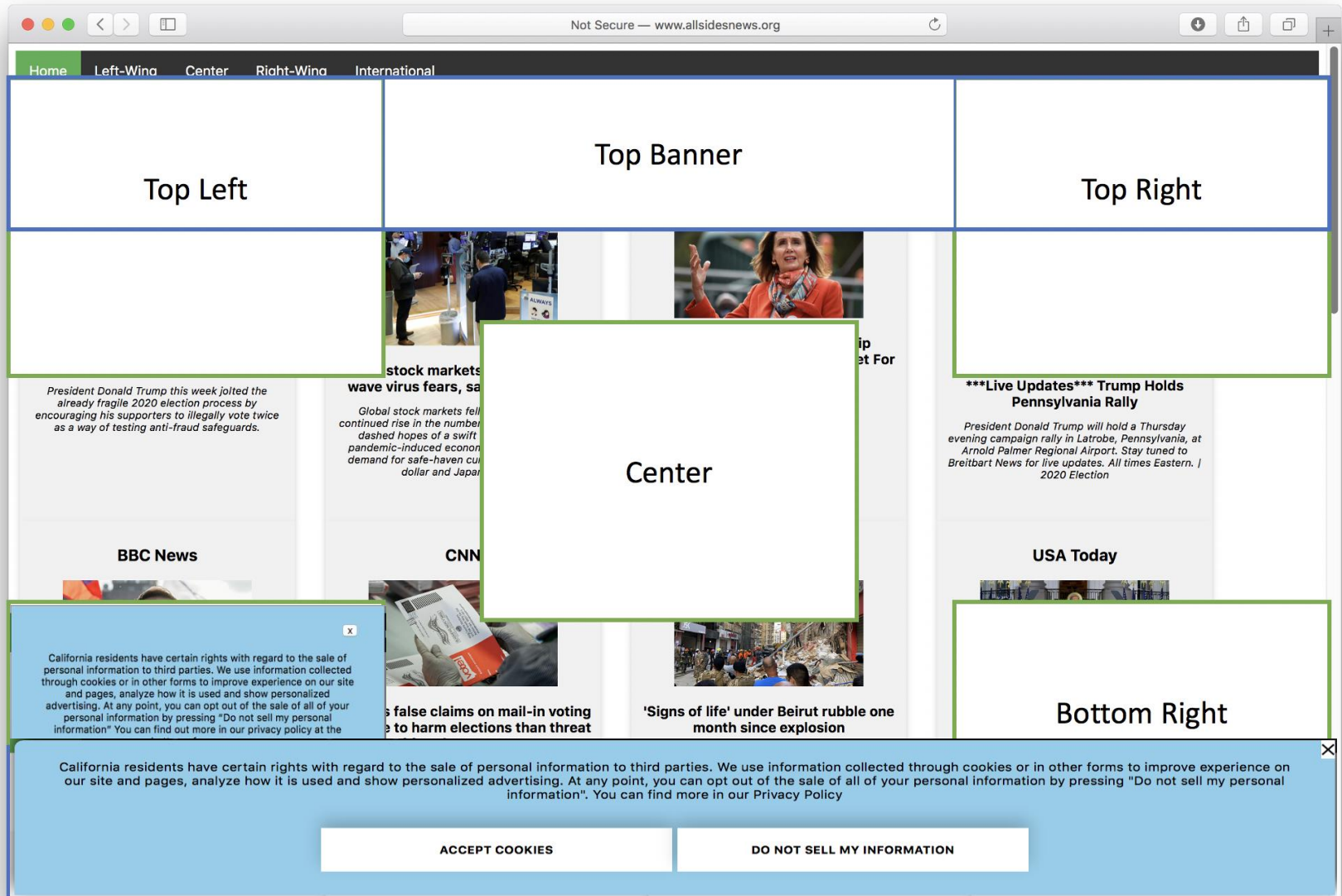
Measurement study

- Top 500 websites
- Conducted manually July 2020-July 2021

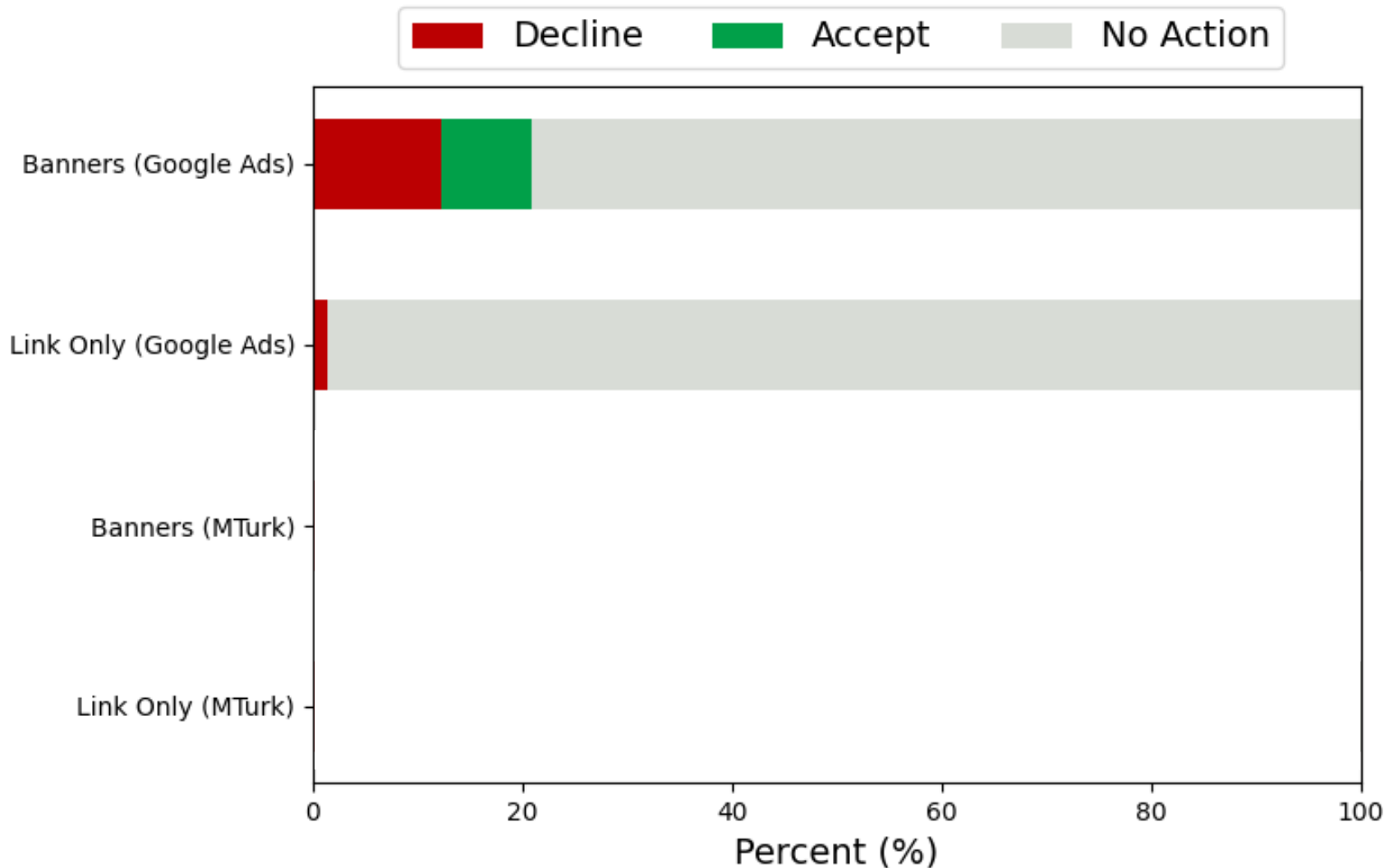
Link Accessibility (Top 500 U.S.)



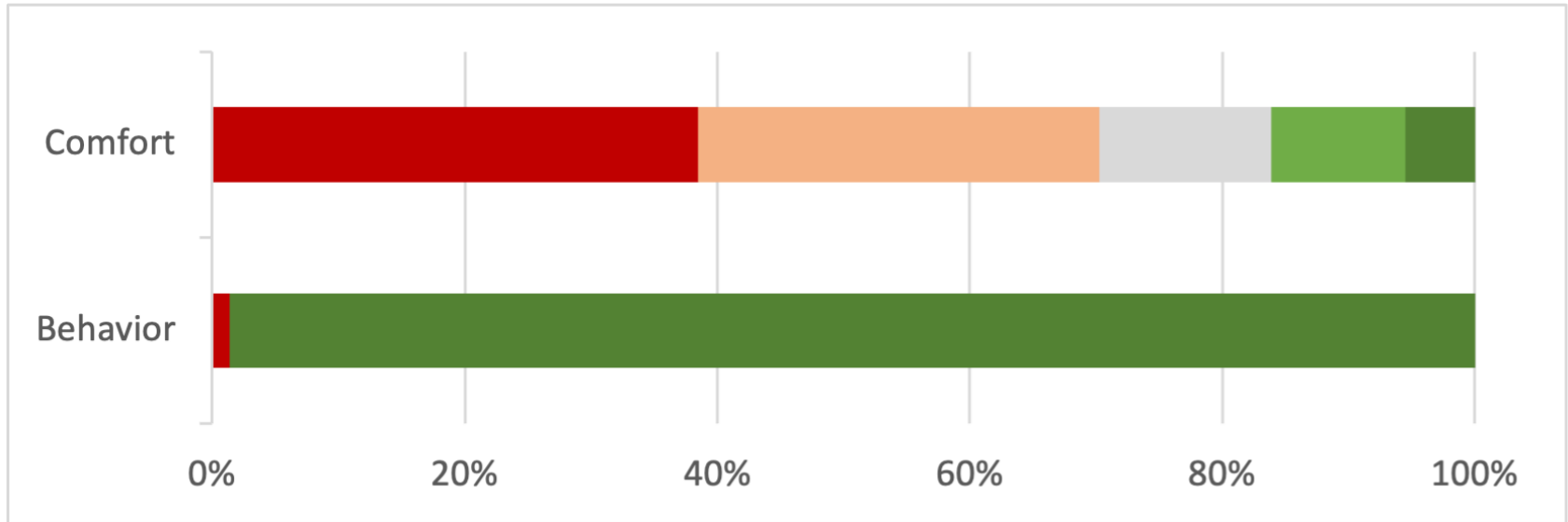
User Study: Link vs. Banners



User Study: Link vs. Banners



Follow-up Questions

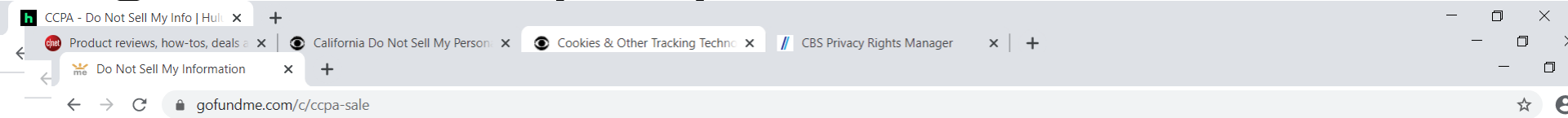


45.5%

California DO NOT SELL Web Form

You can use this form to submit a request to opt out of the sale of personal information associated with a California resident or household.

A member of DTMG's privacy team will respond as soon as possible after you submit this



Search For individuals For nonprofits



How it works

Sign in

Start a GoFundMe

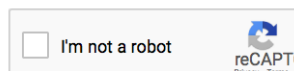
Pursuant to our [California Consumer Privacy Act Notice](#) available to California residents, to opt out of a sale of your information generally, please visit either the [Network Advertising Initiative's Consumer opt-out link](#) or the [Digital Advertising Alliance's Consumer opt-out link](#). These sites will permit you to manage cookies from being put on your computer by us or others.

In addition, please exercise your choices regarding any action taken by the Social Networking Services we employ, which links are provided here:

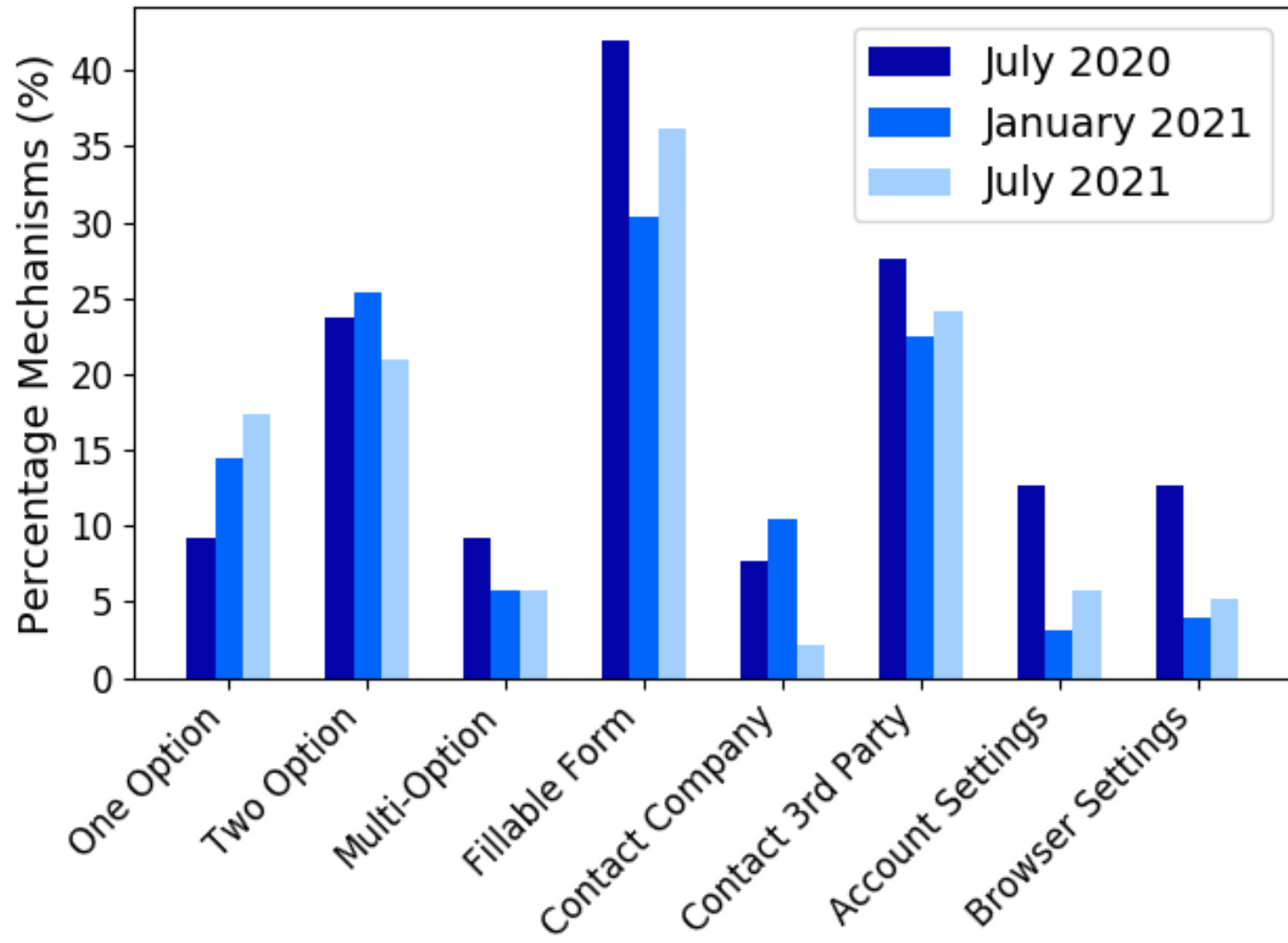
Facebook	Facebook Privacy Policy	Facebook Terms of Service
Instagram	Instagram Privacy Policy	Instagram Terms of Service
Kakao	Kakao Privacy Policy	Kakao Terms of Service
Line	Line Privacy Policy	Line Terms of Service
LinkedIn	LinkedIn Privacy Policy	LinkedIn Terms of Service
Twitter	Twitter Privacy Policy	Twitter Terms of Service
Vimeo	Vimeo Privacy Policy	Vimeo Terms of Service
YouTube	YouTube Privacy Policy	YouTube Terms of Service



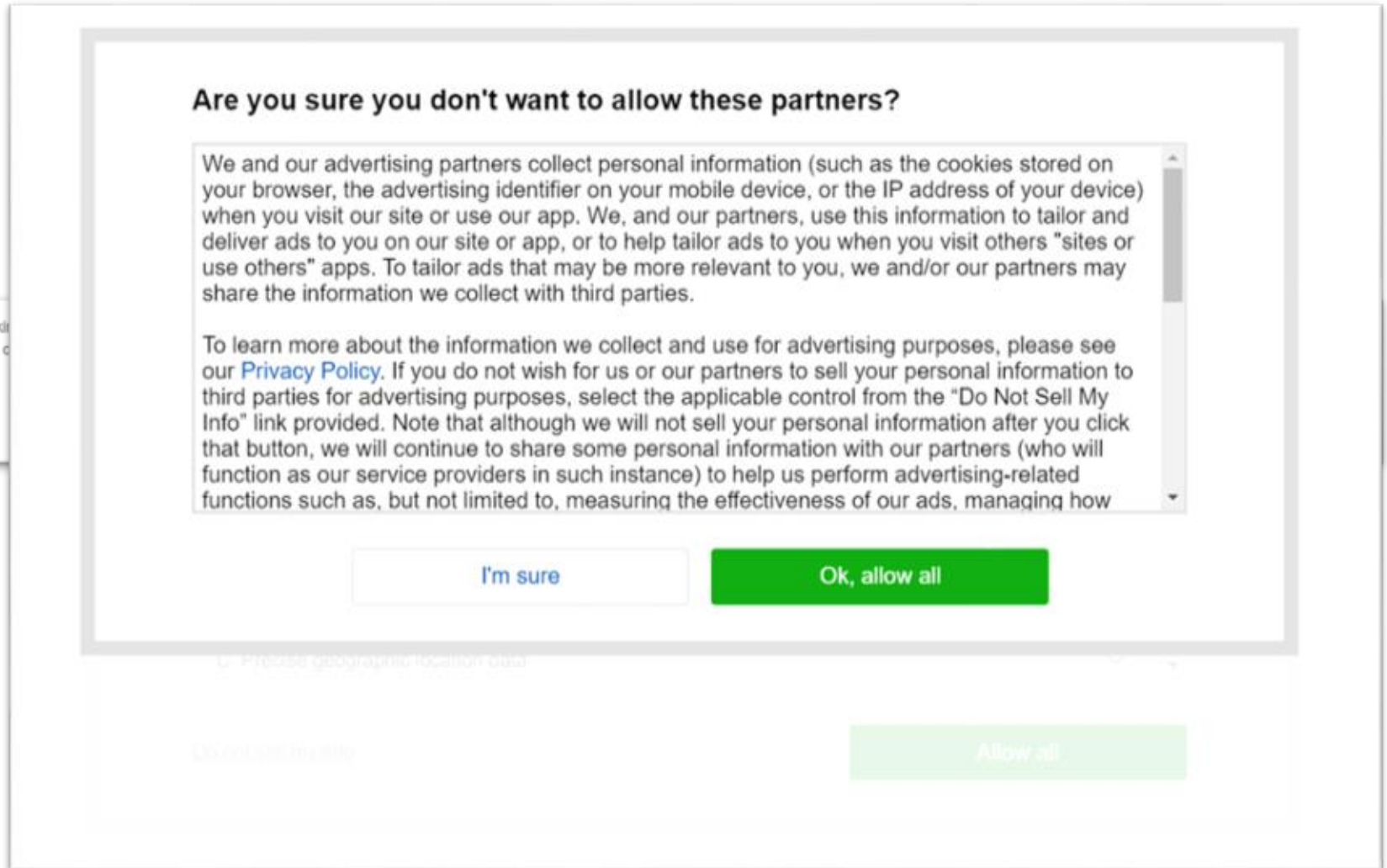
accurate.



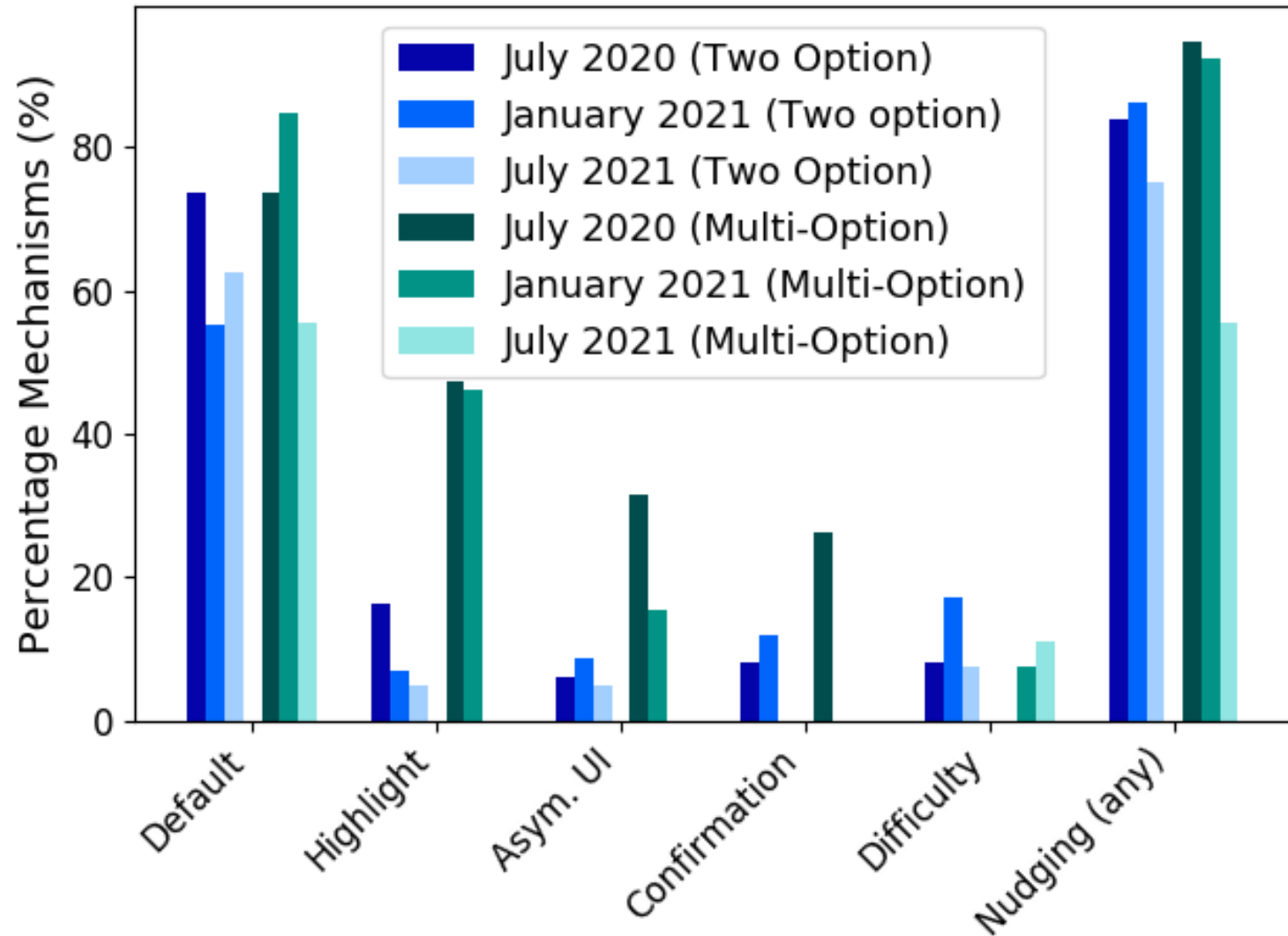
Opt-out Mechanisms



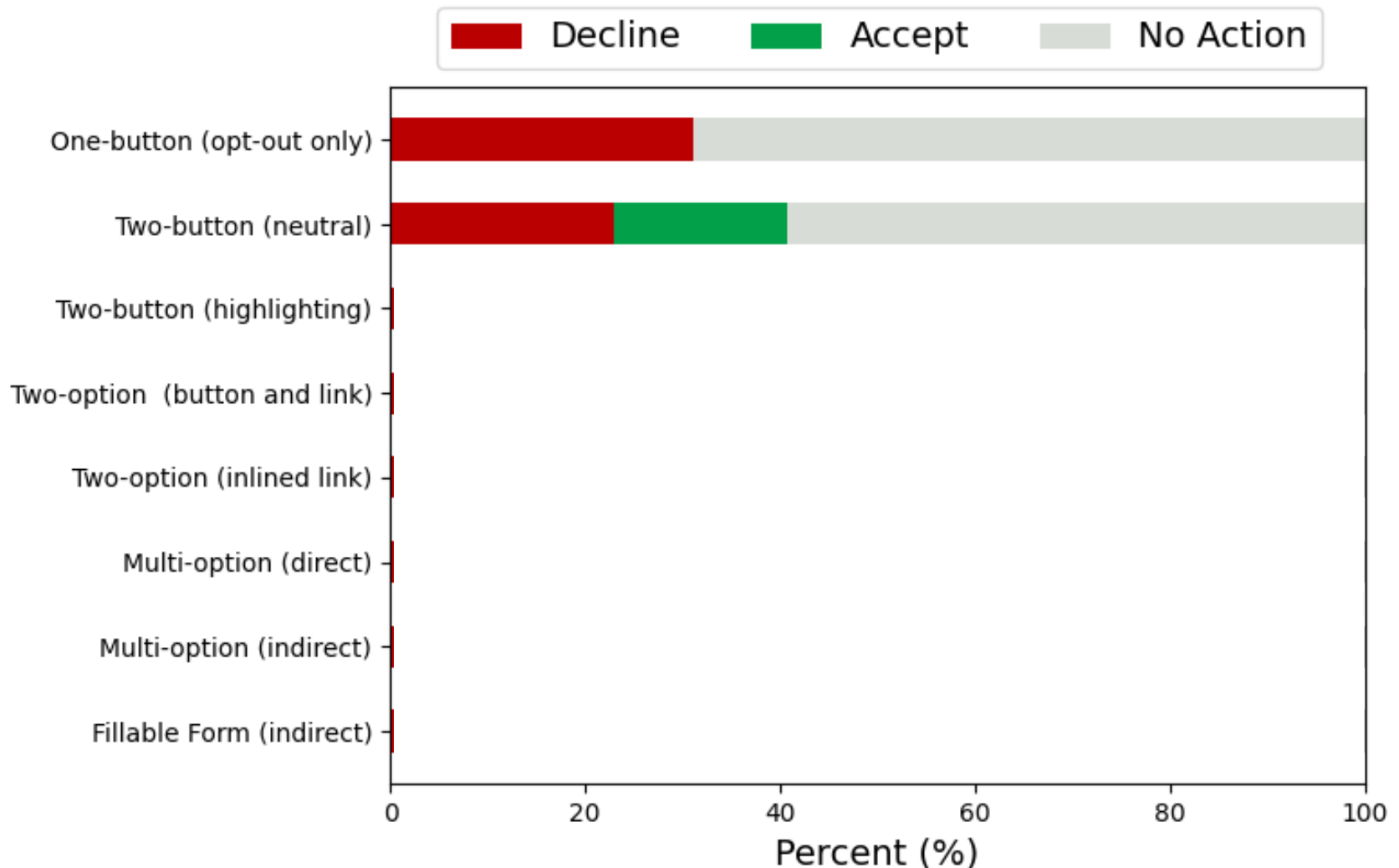
Nudging



Nudging



User Study: Nudging and Inconvenience



DISAPPOINTED

BUT NOT SURPRISED



Idea 1: Improve Recognizability

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.]

Exercise: Opt-out of Sale Icon

- Design an standardized icon that you think users would recognize as an option to opt-out of sale of personal information

Icon ideation focused on 3 concepts

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



Preliminary icon Designs

Choice/consent



Opting out



Do not sell (personal info)

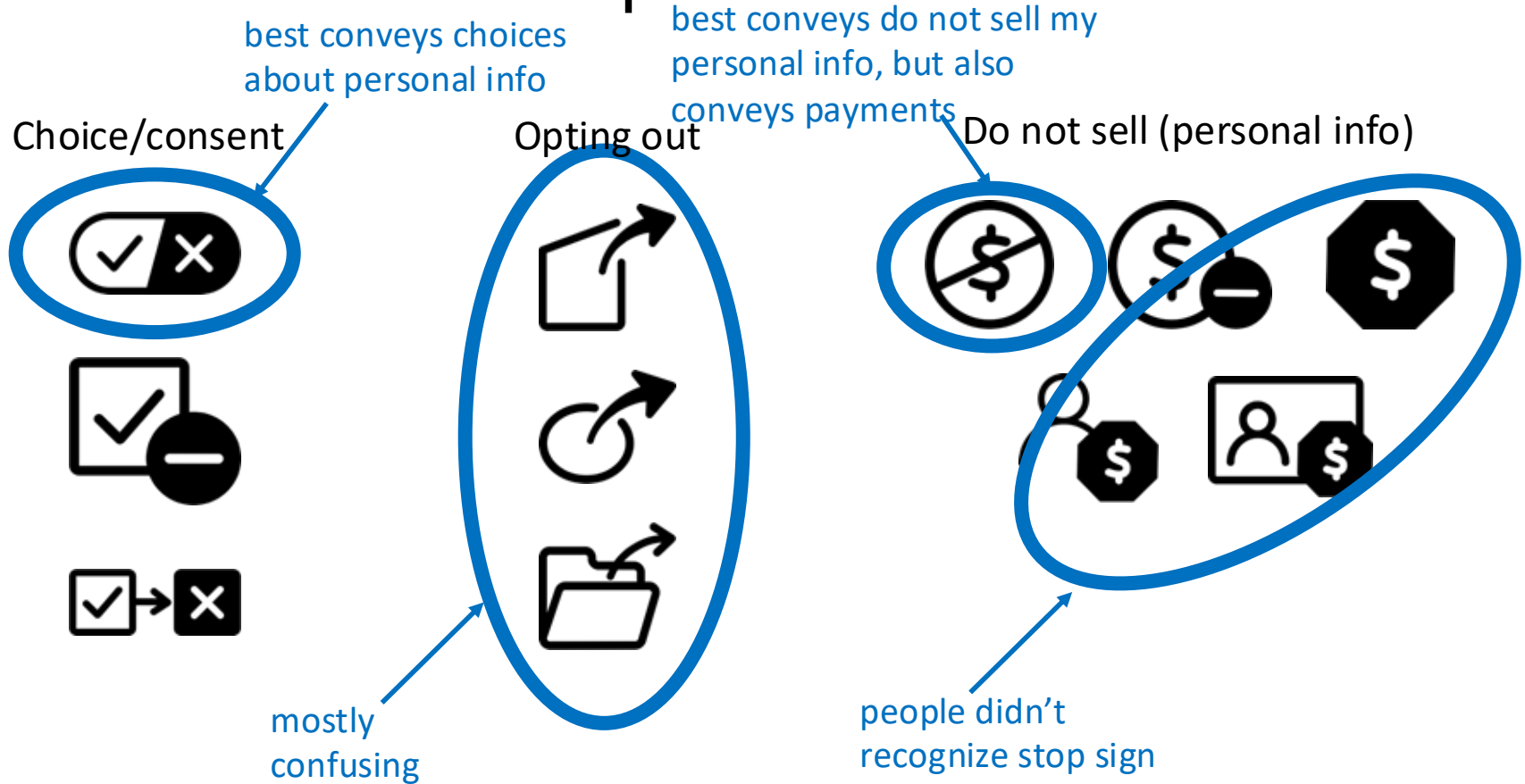


DAA Privacy
Rights

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



Refined icons for evaluation

ID-Card



Slash-Dollar



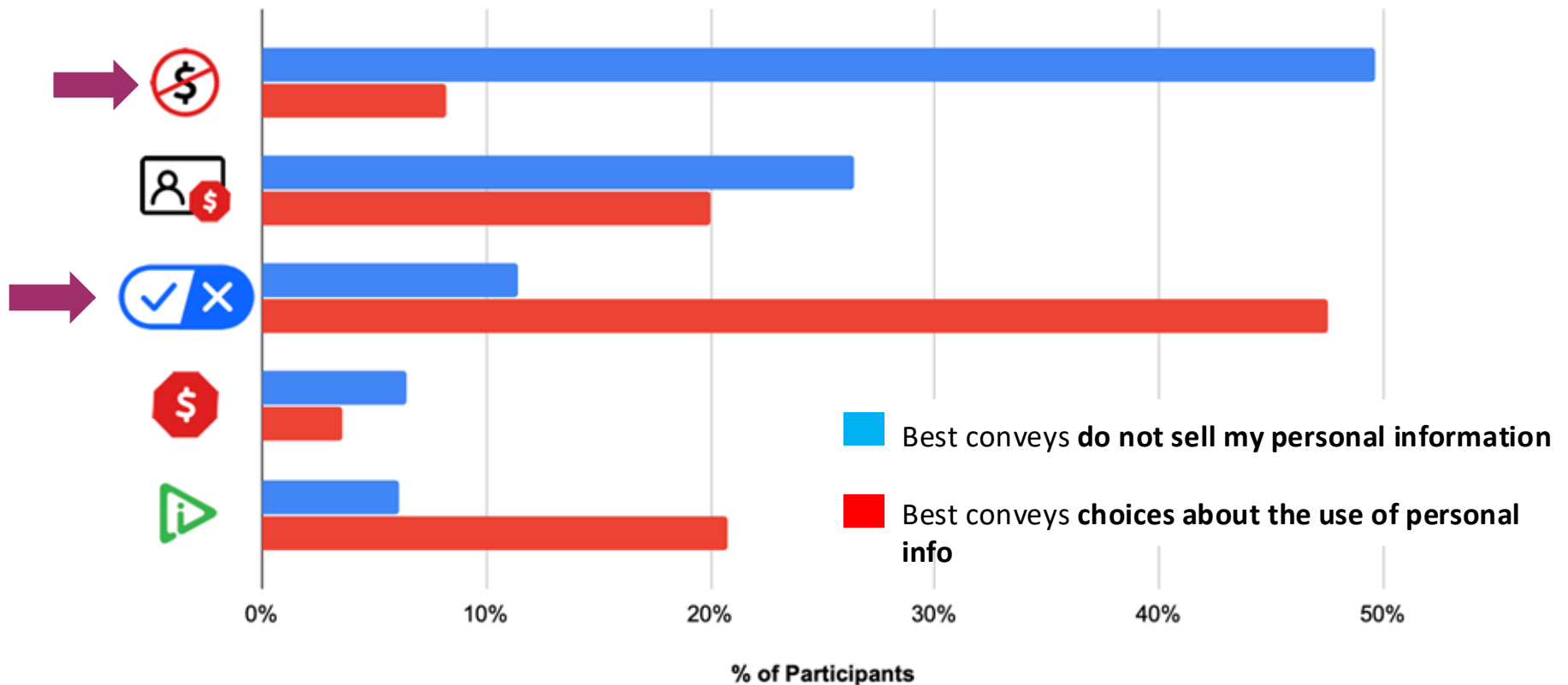
Stop-Dollar



Toggle



DAA



Icon	Common Interpretations without tagline (# of participants)
Toggle 	✓ accept/decline something (11) ✓ activate/deactivate something (5) • okay/exit options (4) • mark as true/false (4) 17
DAA 	• get more information (15) • start audio/video content (7) • denotes website is safe or private (3) • move forward or next (2) ✓ something about ads (0) 10 4 2
Slash-dollar 	• something is free or requires no money (12) • cash/dollars not accepted (7) • money (4) • does not sell data ✓ opt-out of sale (1) 3 4 7 2



correct interpretation

• **misconception**

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

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 they ran another study

Stylized toggle



CalAG toggle



CalAG-X toggle



+ swapped colors

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

Then the OAG removed the icon

- Icon completely removed from regulation
- OAG will design a uniform and recognizable opt-out button in the future

Former subsection (f), regarding the proposed opt-out button, has been deleted in response to the various comments received during the public comment period. The OAG has removed this subsection in order to further develop and evaluate a uniform opt-out logo or button for use by all businesses to promote consumer awareness of how to easily opt-out of the sale of personal information.

Then they tested more icons from the OAG!

- Which of these icons, paired with the “Do Not Sell My Personal Information” link text performs best
 - standing out to users on a website?
 - communicating the presence of a do-not-sell choice?
 - motivating users to click?
- ... and only recruit participants from CA



tl;dr; None of the icons were very effective

- Showing the link text **without any icon resulted in the highest percentage (64%) of correct expectations**
- Adding any of these icons to the link text introduced misconceptions
- Adding an icon made users more likely to notice link (increased from 31% to 38% - 52%) but did not create a significantly higher intention to click



CCPA PRIVACY OPTIONS Icon



Idea 2: Improve Visibility



CCPA Opt Out Assistant

Offered by: ccpaextension

★★★★★ 4 | [Productivity](#) |  15 users

[Remove from Chrome](#)

[Overview](#)

[Privacy practices](#)

[Reviews](#)

[Related](#)



TAKE CONTROL OF



CCPA Opt-out Assistant

The image is a screenshot of a web browser displaying the NBC News 'Tech & Media' section. The browser's address bar shows 'nbcnews.com/tech-media'. The page features a dark blue header with the NBC News logo and navigation links: PLAN YOUR VACCINE, COVID-19, POLITICS, U.S. NEWS, OPINION, WORLD, BUSINESS, and TECH. A large 'TECH & MEDIA' title is centered on the page. Below the title, there are three main article thumbnails. The first thumbnail shows two police cars with 'POLICE' written on them. The second thumbnail shows two women, one wearing an oxygen mask, with the caption 'CORONAVIRUS' and the headline 'Anger grows as India orders Twitter to remove posts critical of Covid response' by Rhea Mogul. The third thumbnail shows Tim Cook with the caption 'BUSINESS NEWS' and the headline 'Apple will spend \$1 billion to open 3,000-employee campus in North Carolina' by Kif Leswing, CNBC. A red overlay box is positioned in the lower-left corner, containing the text 'This website sells your personal information. Opt out below.' with a link to 'More Info' and a large black button that says 'DON'T SELL MY PERSONAL INFORMATION'.

Technology and Media News | x +

nbcnews.com/tech-media

NEWS PLAN YOUR VACCINE COVID-19 POLITICS U.S. NEWS OPINION WORLD BUSINESS TECH

TECH & MEDIA

POLICE

USA via AP

CORONAVIRUS

Anger grows as India orders Twitter to remove posts critical of Covid response

Rhea Mogul

BUSINESS NEWS

Apple will spend \$1 billion to open 3,000-employee campus in North Carolina

Kif Leswing, CNBC

This website sells your personal information. Opt out below.

[More Info](#)

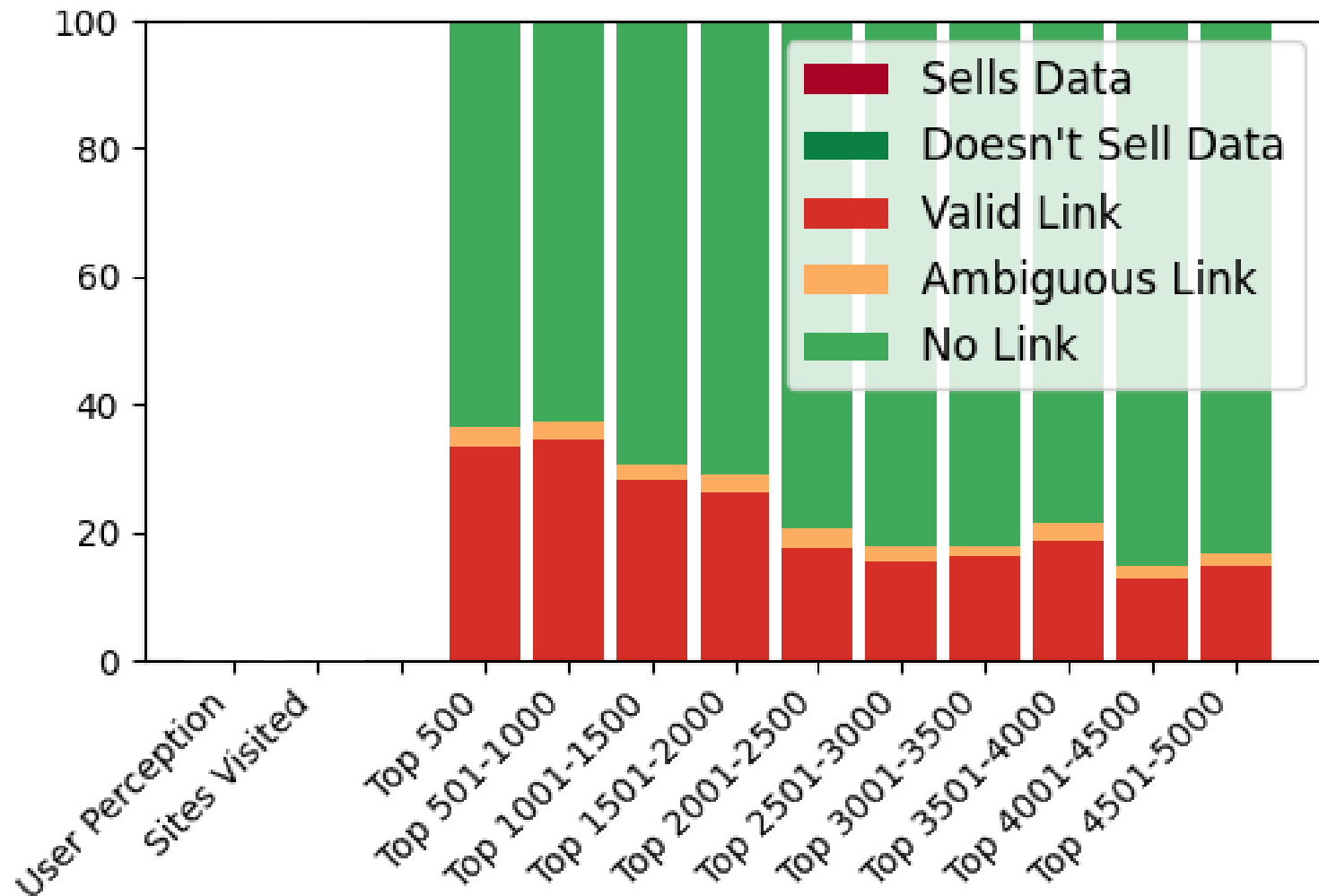
DON'T SELL MY PERSONAL INFORMATION

U.S. NEWS MUSIC SPACE

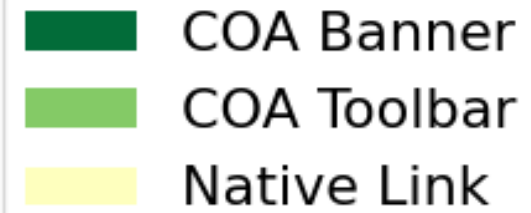
User Study: Extension

- 54 users recruited on MTurk
- 52 users recruited through Google Ads
- Asked to install and use extension for 1 week
 - 32 MTurkers installed CCPA Opt-out Assistant
 - 22 MTurkers installed control extension
- Logged user behavior
 - hash of website visited
 - whether website had valid (or ambiguous) opt-out of sale link
 - if and how user invoked right to opt-out
- Accepted all participants who used kept extension installed for at least 24 hours

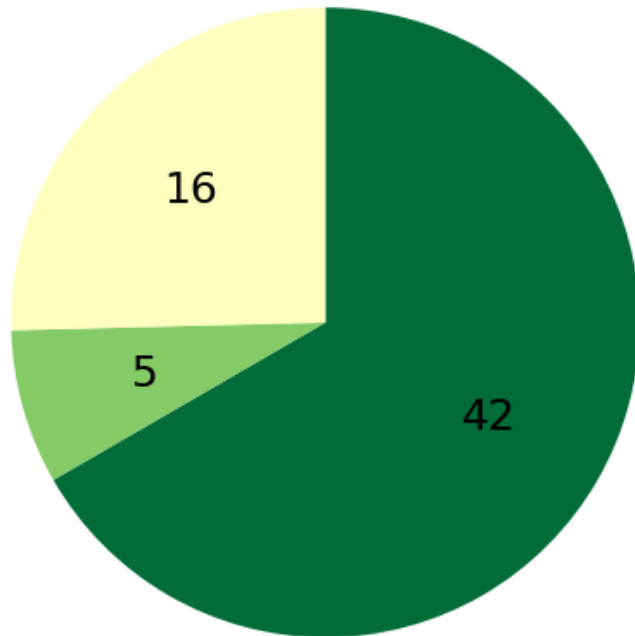
Sale of Personal Information



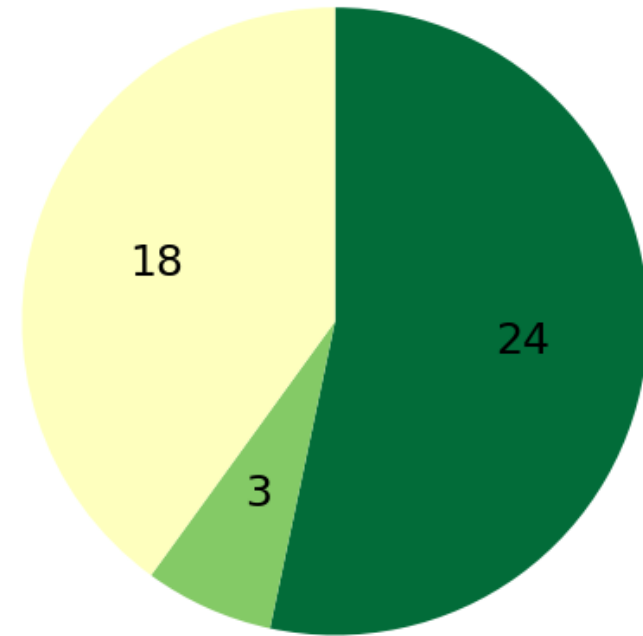
Opt-out Rates



MTurk Users

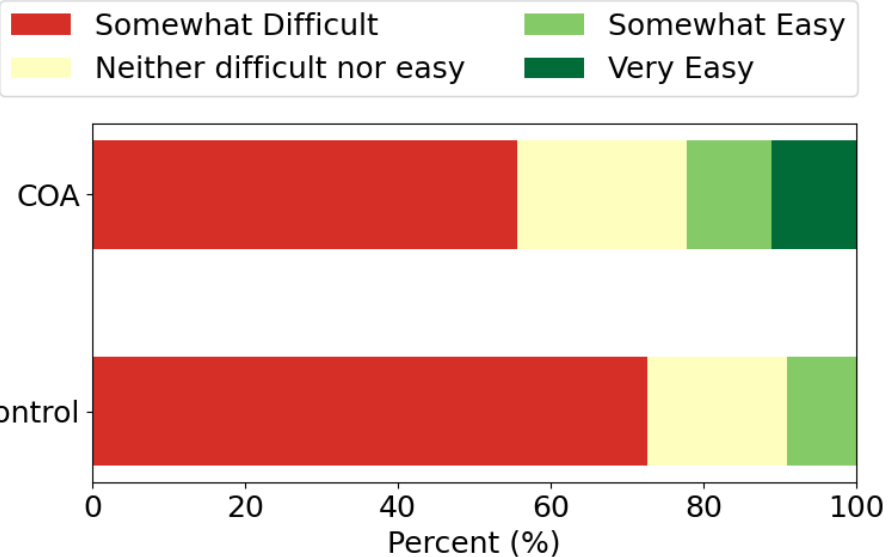


Native Chrome Downloads

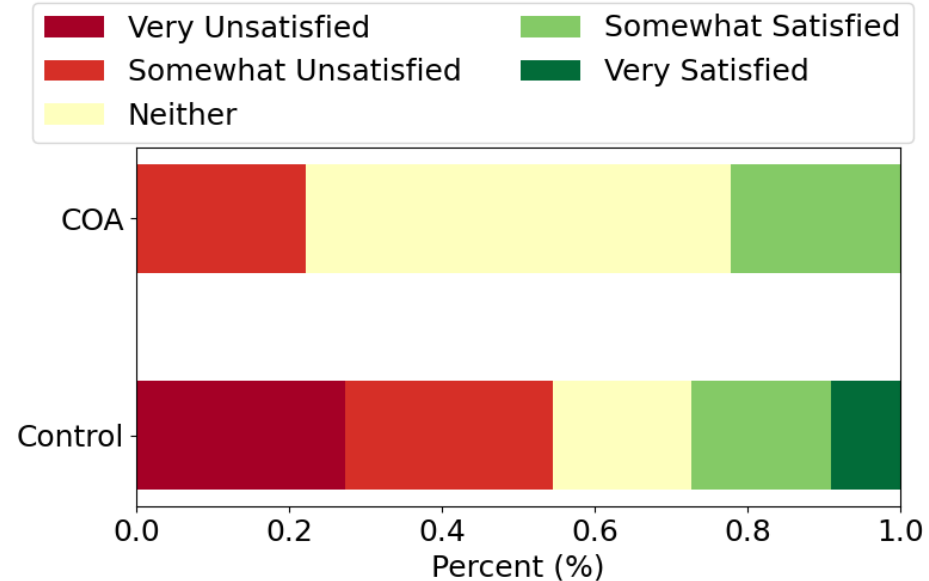


User Experience

Difficulty

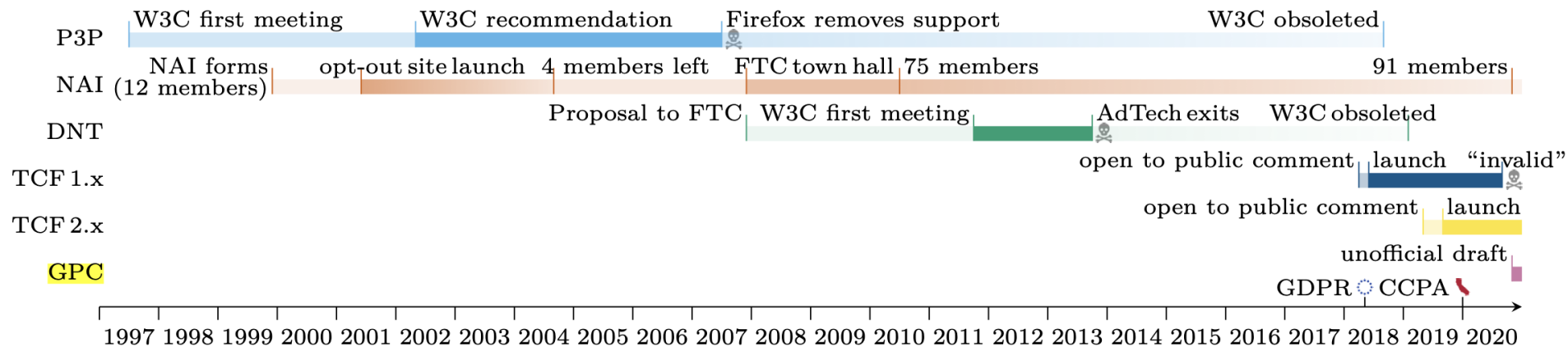


Satisfaction



Idea 3: Automate Opt-outs

- Global Privacy Control (GPC)
- browser signal that indicates desire to opt-out of sale on all websites
- Currently available in Firefox, Brave, DuckDuckGo, etc.
- Also available as a Chrome extension



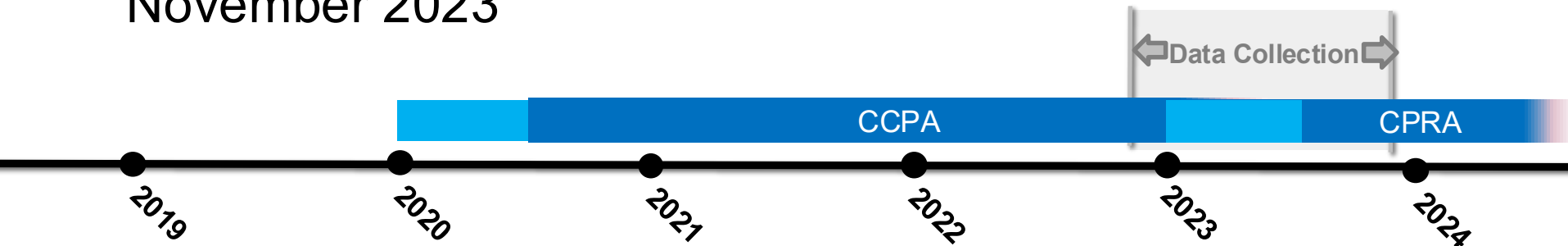
- legally considered a valid signal under California law

Measurement Study

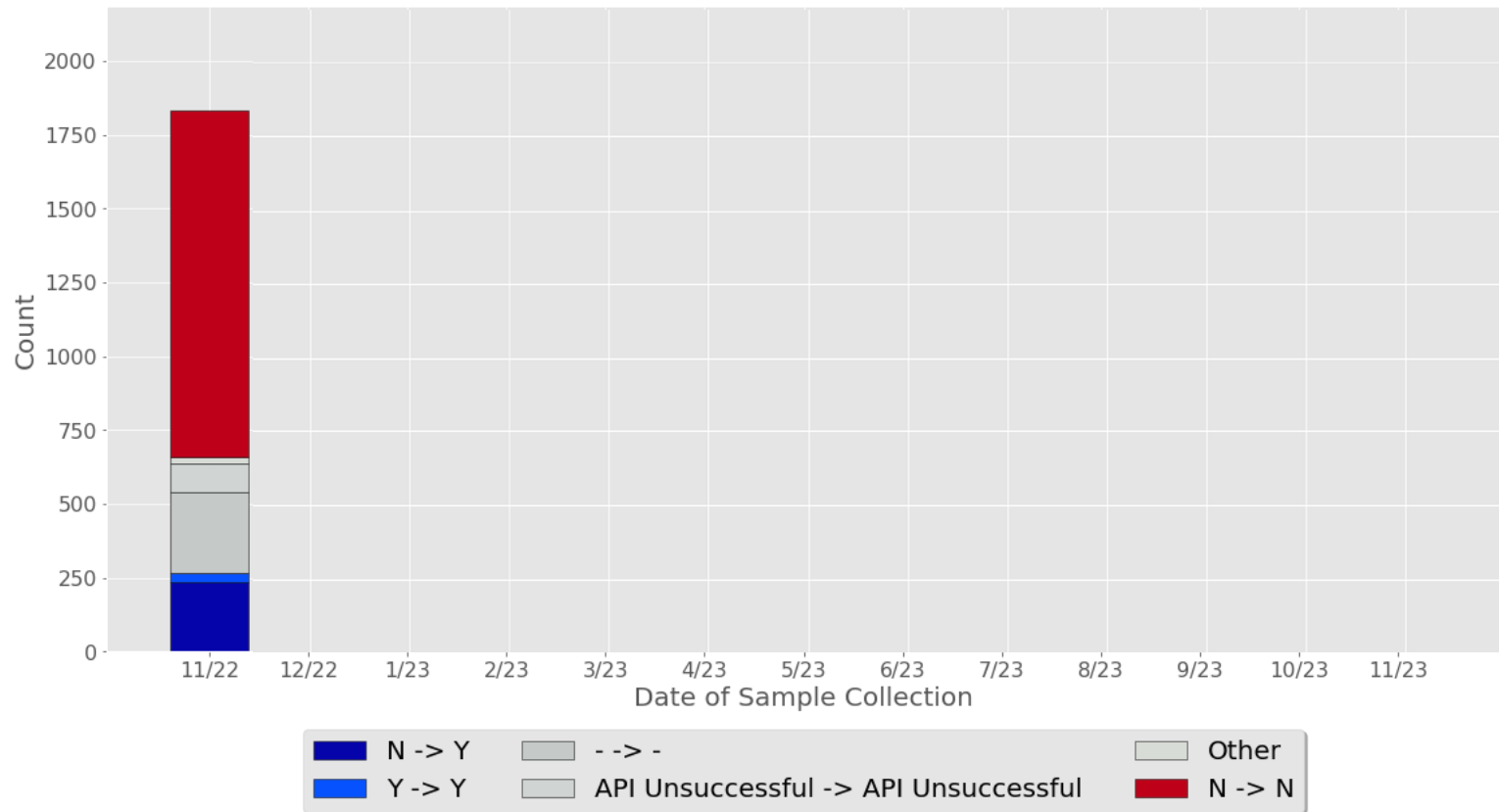
- Crawled 25,000 websites from Tranco top website list
- Recorded:
 - Response to GPC signal
 - US Privacy String when GPC is not enabled
 - US Privacy String when GPC is enabled
 - Presence/absence of CCPA opt-out of sale link on homepage
 - Privacy policy language
 - Presence/absence of /.well-know/gpc.json file
- Conducted monthly crawls between November 2022 and November 2023

U.S. Privacy String:

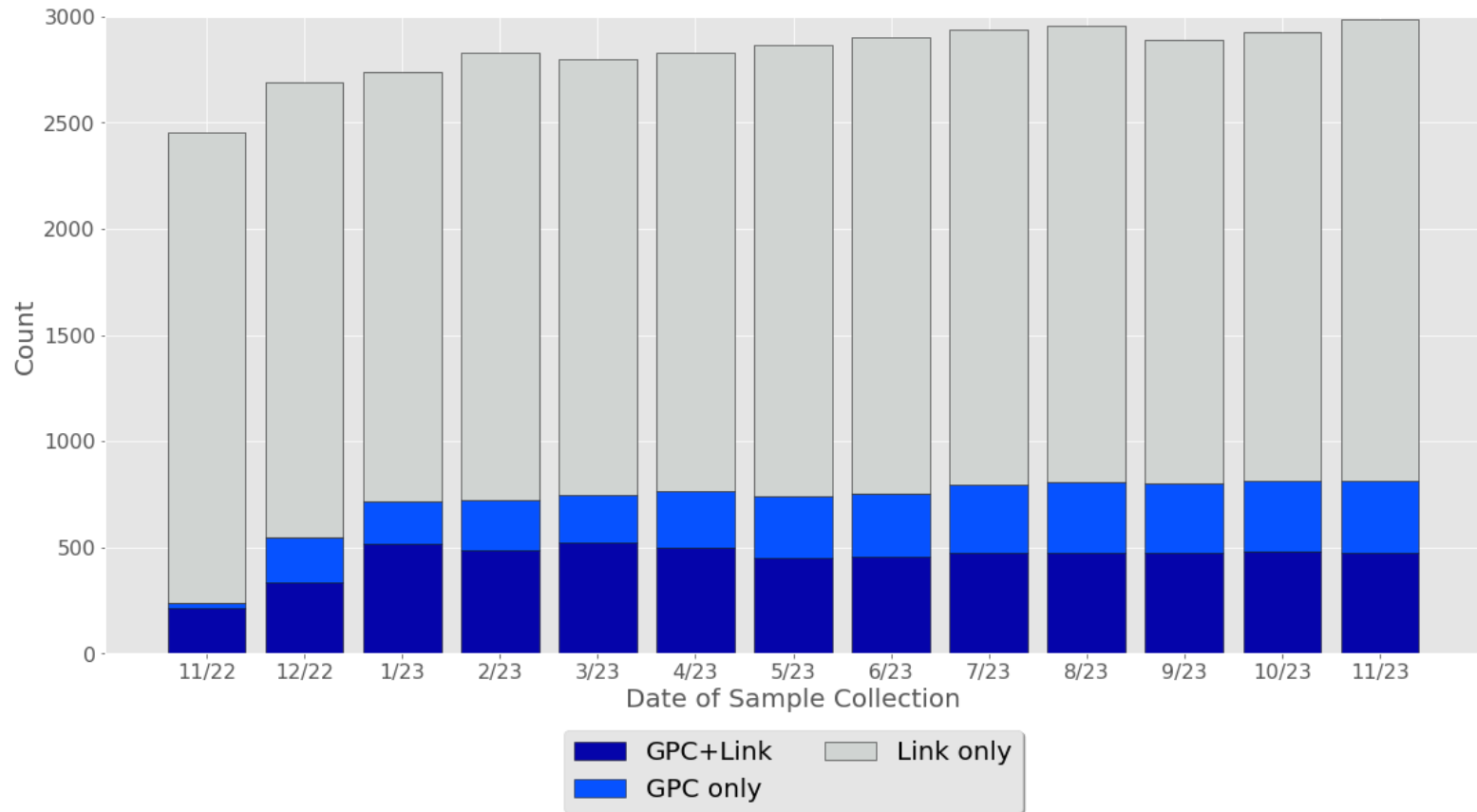
- IAB specification
- 4-character string 1YNN
- sent to 3rd parties
- accessible through API
- supported until 1/1/2024



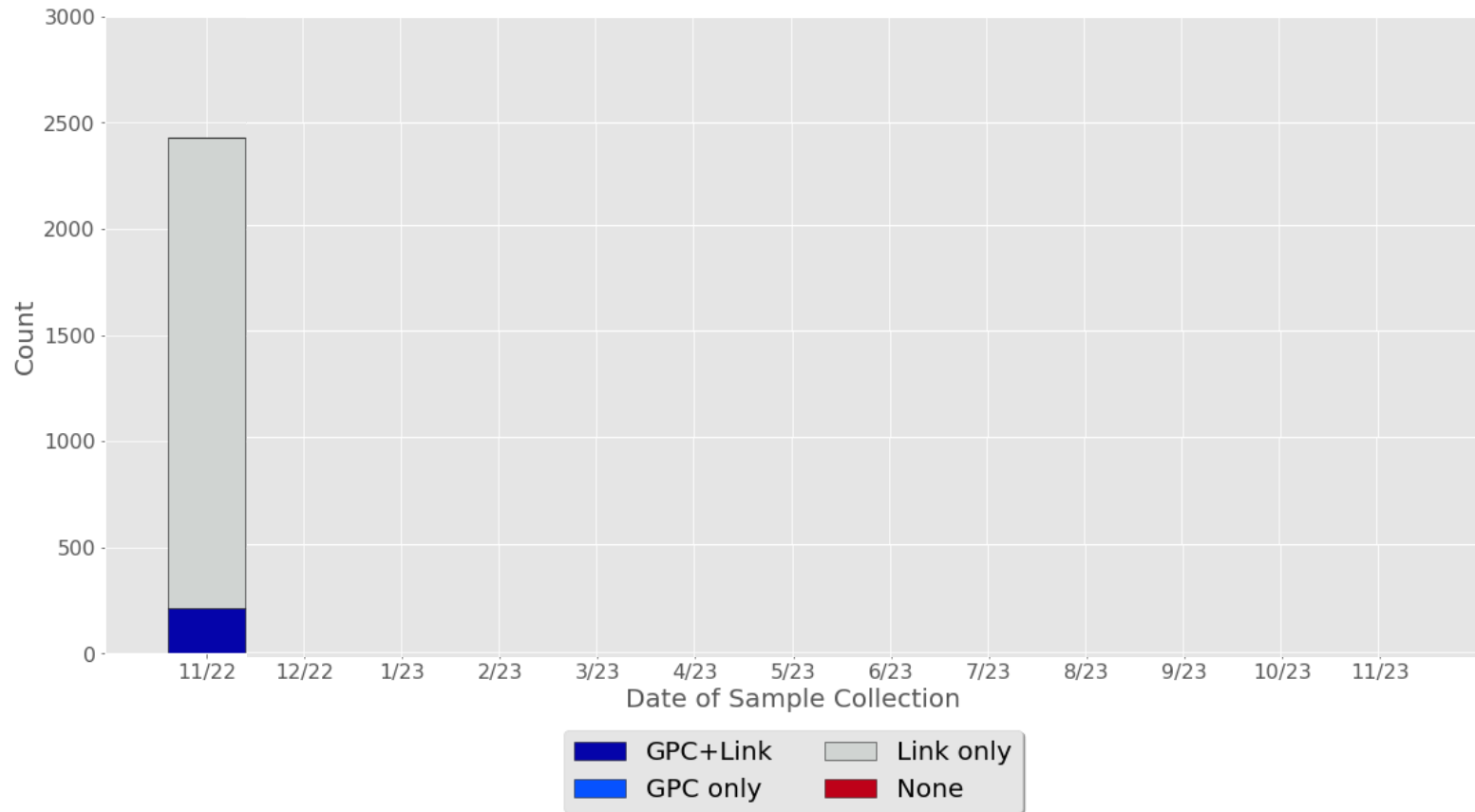
Response to GPC Signals



Prevalence of Opt-out of Sale Mechanisms

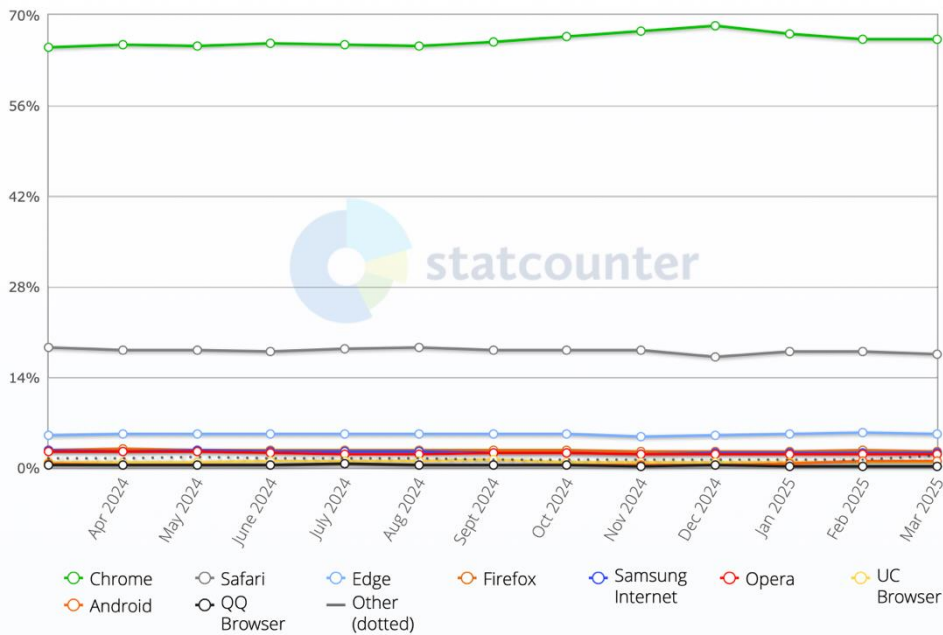


Websites that had opt-out links in Nov. 2022

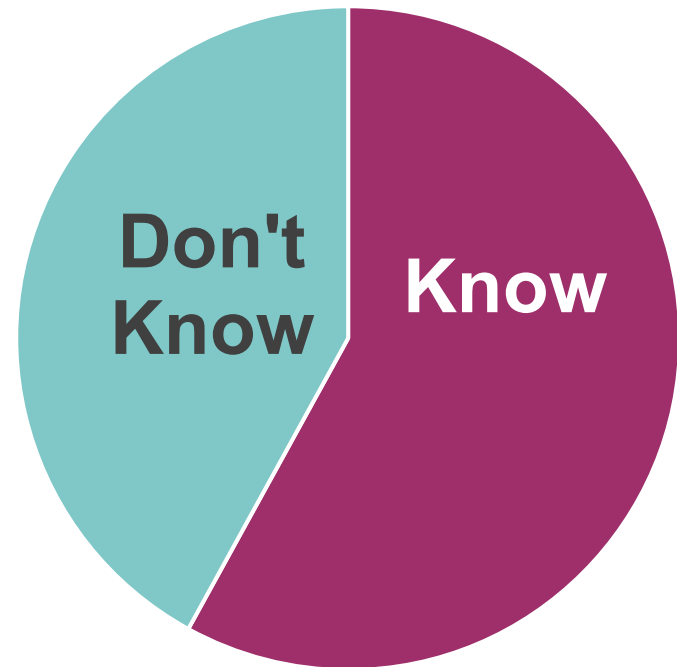


Additional Limitations of GPC

Market Penetration



User Awareness



All browsers will be required to support GPC starting in January 2027

Additional Limitations of GPC

- (2) A business that allows consumers to opt out of the sale or sharing of their personal information and to limit the use of their sensitive personal information pursuant to paragraph (1) **may provide a link** to a web page that enables the consumer to **consent to the business ignoring the opt-out preference signal** with respect to that business' sale or sharing of the consumer's personal information or the use of the consumer's sensitive personal information for additional purposes provided that:

A Possible Future...

×

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Your choices: Some cookies are optional. Click 'Allow all cookies' to accept all cookies, or edit your cookie preference below and select 'Allow selection.'

More information: Please see our [privacy policy](#).

☒ Strictly Necessary Cookies
☐ Performance Cookies
☐ Functional Cookies
☐ Targeting Cookies

[Show details](#)[Allow selection](#)[Accept all cookies](#)

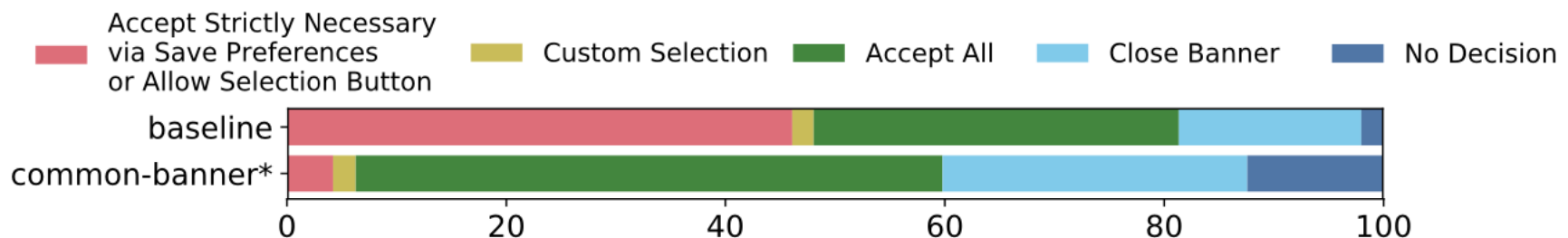
Powered by [OneTrust](#)

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×



CCPA Opt-out of Sale

